J. S. University, Shikohabad

Diploma

THREE YEAR DIPLOMA COURSE IN

Electronics Engineering

Scheme

&

Syllabus

[Effective from the session 2015-16]

STUDY AND EVALUATION SCHEME FOR
THREE YEAR DIPLOMA COURSE IN

ELECTRONICS ENGG.

SEMESTER - First

S.No.	Subject Code	Name of Subject	Periods Per Week				Evaluation Scheme			
			L	T	P	D	Sessional	End Exam	Total	Duration
THEORY SUBJECT										
1	DAS-11	Professional Communication	4	1	-	-	20	50	70	2.5
2	DAS-12	Applied Mathematics-I	4	1	-	-	20	50	70	2.5
3	DAS-13	Applied Physics-I	4	1	-	-	20	50	70	2.5
4	DAS-14	Applied Chemistry	4	1	-	-	20	50	70	2.5
5	DEE-11	Electrical & Electronics Engineering Material	4	1	-	-	20	50	70	2.5
PRACTICA/DRAWING SUBJECTS										
5	DWP-11P	Workshop Practice	-	-	10	-	30	60	90	3
6	DAS-11P	Professional Communication	-	-	4	-	20	40	60	3
7	DAS-14P	Applied Chemistry	-	-	4	-	20	40	60	3
8	DGD-10	Games//Social and Cultural Activities + Discipline (15 + 10)							25	
								Grand Total	585	

NOTE:- (1) Each period will be 50 minutes duration.

(2) Each session will be of 16 weeks.

(3) Effective teaching will be at least 14 weeks.

(4) Remaining periods will be utilised for revision etc.

STUDY AND EVALUATION SCHEME FOR
THREE YEAR DIPLOMA COURSE IN

ELECTRONICS ENGG..

SEMESTER - Second

S.No.	Subject Code	Name of Subject	Periods Per Week				Evaluation Scheme			
			L	T	P	D	Sessional	End Exam	Total	Duration
THEORY SUBJECT										
1	DAS-22	Applied Mathematics-II	4	1	-	-	20	50	70	2.5
2	DAS-23	Applied Physics-II	4	1	-	-	20	50	70	2.5
3	DEE-21	Basic Electrical Engg	4	1	-	-	20	50	70	2.5
4	DEC-21	Electronics - I	4	1	-	-	20	50	70	2.5
5	DDW-21	Engineering Drawing	-	-	-	8	20	50	70	3
PRACTICA/DRAWING SUBJECTS										
6	DAS-23P	Applied Physics-II Lab	-	-	4	-	20	40	60	3
7	DEE-21P	Basic Electrical Engg Lab	-	-	4	-	30	60	90	3
8	DEC-21P	Electronics – I Lab	-	-	4	-	30	60	90	3
9	DGD-20	Games//Social and Cultural Activities + Discipline (15 + 10)							25	
								Grand Total	615	

NOTE:- (1) Each period will be 50 minutes duration.

(2) Each session will be of 16 weeks.

(3) Effective teaching will be at least 14 weeks.

(4) Remaining periods will be utilised for revision etc.

STUDY AND EVALUATION SCHEME FOR
THREE YEAR DIPLOMA COURSE IN
ELECTRONICSENGG.

SEMESTER - THIRD

S.No.	Subject Code	Name of Subject	Periods Per Week				Evaluation Scheme			
			L	T	P	D	Sessional	End Exam	Total	Duration
THEORY SUBJECT										
1	DAS-31	Applied Mathematics-III	4	1	-	-	20	50	70	2.5
2	DEE-33	Electrical Engineering-II	4	1	-	-	20	50	70	2.5
3	DEC-31	Industrial Electronics & Transducers.	4	1	-	-	20	50	70	2.5
4	DCS-32	Programming In C & C++	4	1	-	-	20	50	70	2.5
PRACTICA/DRAWING SUBJECTS										
5	DEE-33P	Electrical Engineering-II Lab	-	-	4	-	20	40	60	3
6	DEC-31P	Industrial Electronics & Transducers. Lab	-	-	4	-	20	40	60	3
7	DCS-32P	Programming In C & C++ Lab	-	-	4	-	30	40	70	3
8	DEC-35P	Electronics Workshop	-	-	4	-	20	40	60	3
9	DGD-30	Games//Social and Cultural Activities + Discipline (15 + 10)							25	
								Grand Total	555	

NOTE:- (1) Each period will be 50 minutes duration.

(2) Each session will be of 16 weeks.

(3) Effective teaching will be at least 14 weeks.

(4) Remaining periods will be utilised for revision etc.

STUDY AND EVALUATION SCHEME FOR
THREE YEAR DIPLOMA COURSE IN

ELECTRONICS ENGG.

SEMESTER - FOURTH

S.No.	Subject Code	Name of Subject	Periods Per Week				Evaluation Scheme			
			L	T	P	D	Sessional	End Exam	Total	Duration
THEORY SUBJECT										
1	DEC-42	Networks, Filters & Transmission Lines	4	1	-	-	20	50	70	2.5
2	DEC-43	Electronic Devices And Circuits	4	1	-	2	20	50	70	3
3	DEC-44	Principles of Communication Engineering	4	1	-	-	20	50	70	2.5
4	DEC-45	Principles of Digital Electronics	4	1	-	-	20	50	70	2.5
PRACTICA/DRAWING SUBJECTS										
5	DEC-42P	Networks, Filters & Transmission Lines Lab	-	-	4	-	20	40	60	3
6	DEC-43P	Electronic Devices And Circuits Lab	-	-	4	-	20	40	60	3
7	DEC-44P	Principles of Comm. Engineering Lab	-	-	4	-	20	40	60	3
8	DEC-45P	Principles of Digital Electronics Lab	-	-	4	-	20	40	60	3
9	DGD-40	Games//Social and Cultural Activities + Discipline (15 + 10)							25	
								Grand Total	545	

NOTE:- (1) Each period will be 50 minutes duration.

(2) Each session will be of 16 weeks.

(3) Effective teaching will be at least 14 weeks.

(4) Remaining periods will be utilised for revision etc.

STUDY AND EVALUATION SCHEME FOR
THREE YEAR DIPLOMA COURSE IN

ELECTRONICS ENGG. (E.C.)

SEMESTER - Fifth

S.No.	Subject Code	Name of Subject	Periods Per Week				Evaluation Scheme			
			L	T	P	D	Sessional	End Exam	Total	Duration
THEORY SUBJECT										
1	DIM-51	Industrial Management and Entrepreneurship Development	4	1	-	-	20	50	70	2.5
2	DEC-51	Electronic Instruments And Measurement	4	1	-	-	20	50	70	2.5
3	DEC-52	Audio And Video Engg.	4	1	-	-	20	50	70	2.5
4	DEC-53	Microprocessor And Application.	4	1	-	-	20	50	70	2.5
PRACTICA/DRAWING SUBJECTS										
5	DFE-51P	Field Exposure	-	-	10	-	20	50	70	3
6	DEC-51P	Electronic Instruments And Measurement Lab	-	-	4	-	20	50	70	3
7	DEC-52P	Audio And Video Engg. Lab	-	-	4	-	20	40	60	3
	DEC-53P	Microprocessor And Application. Lab					20	40	60	
8	DGD-50	Games//Social and Cultural Activities + Discipline (15 + 10)							25	
								Grand Total	565	

NOTE:- (1) Each period will be 50 minutes duration.

(2) Each session will be of 16 weeks.

(3) Effective teaching will be at least 14 weeks.

(4) Remaining periods will be utilised for revision etc.

STUDY AND EVALUATION SCHEME FOR
THREE YEAR DIPLOMA COURSE IN

ELECTRONICS ENGG. (E.C.)

SEMESTER - Sixth

S.No.	Subject Code	Name of Subject	Periods Per Week				Evaluation Scheme			
			L	T	P	D	Sessional	End Exam	Total	Duration
THEORY SUBJECT										
1	DDM-61	Environmental Education And Disaster Management	4	1	-	-	20	50	70	2.5
2	DEC-61	Microwave & Radar Engg.	4	1	-	-	20	50	70	2.5
3	DEC-62	Modern Communication System	4	1	-	-	20	50	70	2.5
4	DEC-63	Optical Fiber Engg.	4	1	-	-	20	50	70	2.5
PRACTICA/DRAWING SUBJECTS										
6	DEC-61P	Project	-	-	4	-	50	100	150	3
7	DEC-62P	Modern Communication System Lab	-	-	4	-	30	60	90	3
8	DEC-63P	Optical Fiber Engg. Lab	-	-	4	-	30	60	90	3
9	DGD-60	Games//Social and Cultural Activities + Discipline (15 + 10)							25	
								Grand Total	635	

NOTE:- (1) Each period will be 50 minutes duration.

(2) Each session will be of 16 weeks.

(3) Effective teaching will be at least 14 weeks.

(4) Remaining periods will be utilised for revision etc.

SEMESTER-I

[DAS-11] Professional Communication

1. PART I - COMMUNICATION IN ENGLISH

1.1 Concept of communication, importance of effective communication, types of communication, formal, informal, verbal and nonverbal, spoken and written. Techniques ofcommunication, listening, reading, writing and speaking,

Barriers in communication, Modern tools of communication-Fax, e-mail, Telephone, telegram, etc.

1.2 Technical communication Vs. General Communication: Development of comprehension and knowledge of English through the study of text material and language exercises based on the prescribed text book of English.

1.3 Development of expression through:

1.3.1 Paragraph writing, Essay writing, Proposal writing.

1.3.2 Business and personal correspondence (Letters):Kinds of letters:-Official, demi-official, unofficial , for reply or inreply, quotation, tender and order giving letters. Application for a job, Resume.

1.3.3 Report writing and Note making and minutes writing.

1.4 Functional Grammar: Study of sentences and parts of speech(word class), Preposition, Verb, Articles, Abbreviations.

1.5 Vocabulary Building: Homophones, One word substitution,Idioms and Phrases.

1.6 Composition on narrative, descriptive, imaginative, argumentative, discussion and factual topics.

2. PART II - COMMUNICATION IN HINDI

2.1 Development of comprehension and knowledge of Hindi usagethrough rapid reading and language exercises based onprescribed text material developed by IRDT.

2.2 Development of expression through ;Letter writing in Hindi:Kinds of letters:-Official, demi-official, unofficial , for reply or inreply, quotation, tender and order giving letters,Application for a job, Press release in Hindi, Reportwriting.

Note: Paper should be in two parts, part I - English and part II -Hindi.

REFERENCE BOOKS

1. Bookshelf worksheet of Professional Communication, New Delhi: Bookshelf 2008

2. Functional Skills in language and literature by R. P. Singh,New Delhi: Oxford University Press.

3. Oxford English Hindi English Dictionary, New Delhi: Oxford2008

[DAS-11P]Professional Communication Lab

For the practice/exercise the following is suggested:

1. A. Phonetic transcription

B. Stress and intonation:

(At least 10 word for writing and 10 word for pronunciation)

2. ASSIGNMENT: (Written Communication)

Two assignments of approximately 400 word each decided by theteacher concerned.

THE FOLLOWING MODEL IS PROPOSED:

1. A picture/photograph

2. An opening sentence or phrase

3. A newspaper/magazine clipping or report

4. Factual writing which should be informativeor argumentative.

(The students may refer to "Bookshelf worksheet" fortechnical communication)

3. Oral Conversation:

1. Short speeches/declamation: Bid farewell, felicitatesomebody, celebrate a public event, and Offer condolences

2. Debate on current problems/topics

3. Mock Interview: Preparation, Unfolding of personality andexpressing ideas effectively

4. Group discussion on current topics/problems

5. Role Play/ general conversation: Making polite enquiries atRailway Station, Post Office, Banks and other Public places,replying to such enquiries, enquiring about various goodssold in the market and discussing their prices. Complainingabout service at Hotel, restaurant, Offering apologies inreply to such complaints, complain to a company about adefective product you have brought, reply to suchcomplaints.

6. Presentation skill, Use of OHP and LCD.

7. through drilling of model words involving different phoneticsymbols (Vowels, Consonants, and Diphthongs).

4. Aural :Listening to conversation/talk/reading of short passage and then writing down the relevant or main points in thespecified number of words and answering the given questionsThe assignments/project work are to be evaluated by theinternal/ external examiner. The distribution of 30 markse.g.

10 marks for assignment (Given by subject teacher assessional marks)

10 marks for conversation and viva-voce

10 marks for phonetic transcription

[DAS-12] APPLIED MATHEMATICS - I

Unit -1: Algebra-I

1. Arithmetic Mean: nth term, sum, Mean
2. Geometric Mean: nth term, sum,Mean
3. Binomial Theorem for positive, negative and fractional index (without proof)
4. Determinants: Elementary properties of determinants of order 2 and 3, system of linear equations and solution, Cramer`s Rule

. Unit -2: Algebra-II

1. Vector Algebra: Dot and cross product, Scalar and vector triplet product
2. Complex Numbers: Representation, Modulus and Amplitude, De-Moivre theorem application in solving algebraic equations.

Unit -3: Trigonometry

1. Relation between sides and angles of a triangle: Statement of various formula showing relationship between sides and angles of a triangle.
2. Inverse Circular Functions

Unit -4: Differential Calculus-I

1. Functions, limits, continuity, elementary methods of finding limit (right and left)
2. Differentiability, method of finding derivatives, functions of a function, Logarithmic Differentiation, Differentiation of Implicit functions.

Unit -5: Differential Calculus-II

1. Higher order derivatives
2. Derivatives of Special Functions (Exponential, Logarithmic, and Inverse circular functions)
3. Application: Finding Tangent, Rate Measure, Velocity and Acceleration

[DAS-13]APPLIED PHYSICS-I

Topic Wise Distribution

S.no.	Topics	Marks Distribution
1	Unit &Dimensions	4
2	Errors & Measurement	4
3	Heat & Thermodynamics	5
4	Friction	4
5	Circular Motion	5
6	Motion of Planets & satellites	5
7	Dynamic of Rigid Body	6
8	Fluid Mechanics	6
9	Harmonic Motion	6
10	Acoustics	5
	Total	**50**

Detailed Contents

1. UNIT AND DIMENSION

Physical quantity and its types, Unit and its types, Definition of SI units, Dimensions of physical quantities, Dimensional formula and dimensional equation, Principle of homogeneity and its applications, Limitations of dimensional analysis

2. ERRORS AND MEASUREMENTS

Errors, Accuracy and Precision, Types of errors in measurement, Combination of errors, Significant figures, Rounding off

3. HEAT AND THERMODYNAMICS

Modes of heat transfer, Coefficient of thermal conductivity, Conduction through compound medium, Isothermal and Adiabatic process, Zeroth and First law of thermodynamics

4. FRICTION

Introduction, Physical significance of friction, Advantage and disadvantage of friction and its role in daily life, Coefficient of static and dynamic friction and their measurement, Angle of friction, Angle of repose, Motion of a body on a inclined plane

5. CIRCULAR MOTION

Uniform circular motion, Angular velocity and acceleration, centripetal acceleration, Relation between linear and angular velocity and acceleration, Centripetal and centrifugal forces, Practical applications of centripetal forces

6. MOTION OF PLANETS AND SATELLITES

Gravitational force, Acceleration due to gravity and its variation with respect to height and depth from earth, Kapler's law, Escape and orbital velocity, Time period of satellite, Geo-stationary satellite

7. DYNAMIC OF RIGID BODY

Rigid body, Rotational motion, Moment of inertia, Theorems (parallel and perpendicular) of moment of inertia, Expression of M.I. of regular bodies (lamina ,disc, sphere, cylindrical), Radius of gyration, Angular momentum, Conservation of angular momentum, Torque, Rotational kinetic energy, Rolling of sphere on the slant plane

8. FLUID MECHANICS

Surface tension, Capillary action and determination of surface tension from capillary rise method, Equation of continuity, Bernoulli's theorem and its application, Stream line and Turbulent flow, Viscosity, Stokes law, Reynold's number

9. HARMONIC MOTION

Periodic function, Characteristics of SMH, Equation of SMH and determination of velocity and acceleration, Simple pendulum and derivation of its periodic time, Spring-mass system, Energy conservation of SHM, Concept of phase, Definition of free, forced, damped and un-damped vibrations, Resonance and its application, Q-factor

10. ACOUSTICS

Definition of pitch, loudness,quality and intensity of Sound waves, Echo, Reverberation and reverberation time, Sabine's formula without derivation, Acoustics of building defects and remedy.

[DAS-14] APPLIED CHEMISTRY

1. ATOMIC STRUCTURE:

Basic concept of atomic structure, Matter wave concept,Quantum number, Heisenberg's Uncertainty Principle, Shapesof orbitals.

2. CHEMICAL BONDING:

Covalent bond, Ionic & Co-ordinate, Hydrogen bonding,Valence bond theory, Hybridisation, VSEPR theory, Molecular orbital theory

3. CLASSIFICATION OF ELEMENTS:

Modern classification of elements (s p d and f block elements), Periodic properties : Ionisation potentialelectro negativity, Electron affinity.

4. ELECTRO CHEMISTRY-I:

Arrhenius Theory of electrolytic dissociation, Transportnumber, Electrolytic conductance, Ostwald dilution law. Concept of Acid and base: Bronsted, Arrhenius and Lewis theory. Concept of pH based numerical. Buffer solutions,

Indicators, Solubility product, Common ion effect with theirapplication,

5. ELECTRO CHEMISTRY-II:

Redox reactions, Electrode potential (Nernst Equation),Electro-chemical cell (Galvanic and Electrolytic). EMF of a cell and free energy change, Standard electrode potential,Electro chemical series and its application.Chemical andElectrochemical theory of corrosion, Galvanic Series.Prevention of corrosion by various method.

6. CHEMICAL KINETICS:

Law of mass action, order and molecularity of reaction.Activation energy, rate constants, 1st order reactions and2nd order reactions.

7. CATALYSIS:

Definition Characteristics of catalytic reactions, Catalyticpromotors and poison , Autocatalysis and Negative catalysis,Theory of catalysis, Application.

8. SOLID STATE:

Types of solids (Amorphous and Crystalline), Classification(Molecular, Ionic, Covalent, Metallic), Band theory ofsolids (Conductors, Semiconductors and Insulators), types ofCrystals, FCC, BCC, Crystal imperfection.

9. FUELS:

Definition, its classification, high & low Calorificvalue.Determination of calorific value of solid and liquidfuels by Bomb calorimeter.Liquid fuel - Petroleum and its refining, distillate ofpetroleum (Kerosene oil, Disel and Petrol), Benzol and Poweralchol.Knocking, Anti-knocking agents, Octane number andCetane number.Cracking and its type, Gasoling from hydrogenation of coal(Bergius process and Fischer tropsch's process)Gaseous Fuel - Coal gas, Oil gas, Water gas, Producer gas,Bio gas, LPG and CNG.Numerical Problems based on topics

10. WATER TREATMENT:

Hardness of water, Its limits and determination of hardnessof water by EDTA method. Softening methods (Only Sods lime,Zeolote and Ion exchange resin process). Disadvantage ofhard water in different industries, scale and sludge

formation, Corrosion, Caustic embritlement, primming andfoarming in biolers.Disinfecting of Water By Chloramine-T, Ozone and Chlorine.Advantage and disadvantage of chlorinational, Industrialwaste and sewage, Municipality waste water treatment,Definition of BOD and COD. Numerical Problems based ontopics.

11. COLLOIDAL STATE OF MATTER:

Concept of collidal and its types, Different system ofcolloids, Dispersed phase and dispersion medium.Methods of preparation of colloidal solutions, Dialysis andelectrodialysis. Properties of colloidal solution withspecial reference to absorption, Brownian Movement, tyndaleffect, Electro phoresis and coagulation. relative stabilityof hydrophillic and hydrophobie colloids. Protection andprotective colloids. Emulsion, Types, preparation,propertiesand uses. Application of colloids chemistry in differentindustries.

12. LUBRICANTS:

Definition, classification, Necessasity and various kinds oflubricants. Function and mechanism of action of lubricants

and examples. Properties of lubricants, Importance ofadditive compunds in lubricants, Synthetic lubricants and

cutting fluids. Industrial application, its function inbearing.

13. HYDROCARBONS:

A. Classification and IUPAC nomeuclature of organic compoundshamologous series (Functional Group)

B. Preparation, properties and uses of Ethane, Ethene, Ethyne(Acetylene), Benzene and Toluene.

14. ORGANIC REACTIONS & MECHANISM:

1. Fundamental auspects -

A. Electrophiles and nucleophiles, Reaction Intermediates,Free radical, Carbocation, Carbanion

B. Inductive effect, Mesomeric effect, Electromeric effect.

2.A. Mechanism of addition reaction (Markonicove's Rule,Cyanohydrin and Peroxide effect),

B. Mechanism of Substitution reactions; (Nucleophillic)hydrolysis of alkyle halide, electrophillic substitution

halogenation, Sulphonation, Niration and friedel-Craftreaction.

C. Mechanism of Elimination reaction - Dehydration of primaryalcohol, Dehyrohalogenation of primary alkyl halide.

15. POLYMERS :

1. Polymers and their classification. Average degree ofpolymerisation, Average molecular weight, Free radicalpolymerisation (Mechanisms)

2. Thermosetting and Thermoplastic resen -

A. Addition polymers and their industrial application-Polystyrene, PVA, PVC, PAN, PMMA, Buna-S, Buna-N,Teflon.

B. Condensation polymer and their industrial application :Nylon 6, Nylon 6,6, Bakelite, Melamine formaldehyde,

Urea formaldehyde, Terylene or Decron, Polyurethanes.

3. General concept of Bio polymers, Biodegradable polymers andinorganic polymers(Silicon).

16. SYNETHETIC MATERIALS:

A. Introduction - Fats and Oils

B. Saponification of fats and oils , Manufacturing of soap.

C. Synthetic detergents, types of detergents and itsmanufacturing.

3. EXPLOSIVES: TNT, RDX, Dynamite.

4. Paint and Varnish

[DAS-14P] CHEMISTRY LAB

1. To analyse inorganic mixture for two acid and basic radicalsfrom following radicals:

A. Basic Radicals :NH_4^+, Pb^{++}, Cu^{++}, Bi^{+++}, Cd^{++}, As^{+++}, Sb^{+++},Sn^{++}, Al^{+++}, Fe^{+++}, Cr^{+++}, Mn^{++}, Zn^{++}, $Co^{++}Ni^{++}$, Ba^{++}, Sr^{++}, Ca^{++}, Mg^{++}

B. Acid Radicals :CO_3^{--}, S^{--}, SO_3^{--}, CH_3COO^-, NO_2^-,NO_3^- , Cl^-, Br^- , I^- , SO_4^{--}

2. To determine the percentage of available Chlorine in thesupplied sample of Bleaching powder.

3. To determine the total hardness of water sample in terms ofCaCO3 by EDTA titration method using Eriochroma black-Tindicator.

4. To determine the strength of given HCl solution by titrationagainst NaOH solution using Phenolphthalium as indicator.

5. To determine the Chloride content in supplied water sampleby using Mohr's methods.

6. Determination of temporary hard ness of water sample by OHener'smethod.

[DEE-11] ELECTRICAL AND ELECTRONICS ENGG. MATERIALS

1. Classification

Classification of materials with reference totheir atomic structure.

2. Conducting Materials

(i) Resistivity and factors affecting resistivity,such as temperature, alloying and mechanicalstressing.

(ii) Super conductivity and super conducting material.

(iii) Low resistivity materials e.g. copper, aluminiumand steel, their general properties as conductore.g. resistivity, temperature co-efficient,mechanical properties, corrosion,contactresistance and practical application. Uses of mercuryas conducting material.

(iv) Comparison of copper, aluminium and steel forvarious applications as electrical conductor.

(v) Low resistivity copper alloys: brass, bronze (cadmiumand beryllium), their practical application.

(vi) High resistivity materials :manganin, constantannichrome, carbon, tungsten, their practicalapplications.

(vii) Electric lamp materials.

(viii) Brush contact materials.

(ix) Soldering materials.

(x) Thermocouple materials, Fuse materials.

3. Insulating Materials

(i) Introduction.

(ii) Properties of insulating material.- Electrical properties: Volume resistivity, Surfaceresistivity, Dielectric Loss, Dielectric Contant,Dielectric strength.- Mechnical properties:- Mechanical strength- Physical properties :- Hygrscoopcity tensile andcompressive strength, Abrasive resistancebrittleness.- Thermal properties - Heat resistance, Classificationaccording to high permissible temperature rise,Effect of over loading on the life of an

electricalappliances, Increase in rating with the use ofinsulating materials having higher thermalstability,Thermal conductivity.- Chemical properties - Solubility, Chemicalresistance, Weather ability.

(iii) Insulating materials and their application-

- Definition and classification- Thermo setting materials e.g. Phenol Formaldehyde,Resins (i.e. Backelite), Amino resins (Urecaformaldehyde and Malamine formaldehyde), Epoxyresins their properties, Applications and Commericalnames.- Thermo Plastic materials e.g. Polyvinyl Chloride(P.V.C.), Poly EtheleneSilicons their propertiesapplication and commerical names. Brief descriptionof extrusion and moulding process of using plastic

materials in electrical engineering.- Natural Insutaling Materials- Mica and Mica products,Asbestos and Asbestos products, Ceramic materials(Porcelain and Stealite), Glass and glass products,Cotton, Silk, Jute, Paper (Dry and impregnated),Rubber Butuman, Mineral and insulating oil fortransformer, switch gear, capactors, high voltagecables, insulating varnishes for coating andimpregnation, Enamels for winding wires, Glass fibresleeves Gasous Materials e.g. Air, Hydrogen, Nitrogen and SF6.

4. Magnetic Materials :

(i) Classification of magnetic materials into soft andhard magnetic materials.

(ii) Soft magnetic materials - high silicon alloy steelfor transformers and low silicon alloy steel,for electric rotating machine cold rolled grainoreinted and non-oriented steel, Nickel iron alloy,soft ferrites, their properties and uses.

(iii) Hard magnetic materials - tungsten steel,chromesteel, cobalt steel, alnico, hard ferrites, theirproperties and applications.

5. Semiconductor Materials

Introduction, semiconductor and their applications,Different semiconductor materials used inmanufacturing various semiconductor (Si & Ge),Material used for electronic components like resister,capactor, diode, transistors and inductors.

6. Special Purpose Materials :

Materials used in transistor and IC manufacturing,PC BS, computer memory devices (name of suchmaterials to be added)Ferrous and non ferrous materials.Thermistor, Sensistor, Varistor and therir practicalapplications.

[DWS-11P] WORKSHOP PRACTICE

1. Carpentry Shop :

EX-1 Introduction & demonstration of tools used in carpentry shop and different types of joints, typesof wood, seasoning and preservation of wood

EX-2 Planing and sawing practice

EX-3 Making of lap joint

EX-4 Making of mortise and tenon joint

Ex-5 Making of any one utility article such as woodenpicture frame, hanger, peg, name plate, etc.

2. Painting and Polishing Shop:

EX-1 Introduction of paints, varnishes, Reason for surfacepreparation, Advantange of painting, other method ofsurface coating i.e. electroplating etc.

EX-2 To prepare a wooden surface for painting apply primeron one side and to paint the same side. To prepare

french polish for wooden surface and polish the other side.

Ex-3 To prepare metal surface for painting, apply primerand paint the same.

EX-4 To prepare a metal surface for spray painting,firstspray primer and paint the same by spray painting gunand compressor system.

3. Sheet Metal and Soldering Shop :

EX-1 Introduction and Types of sheets, measuring of sheets

EX-2 Study and sketch of various types of stakes/anvil.

EX-3 Introduction & demonstration of tools used inSheet metal working shop.

EX-4 Cutting, shearing and bending of sheet.

EX-5 To prepare a soap case by the metal sheet.

4. Fitting Shop, Plumbing Shop & Fastening Shop:

EX-1 Study of materials, limits, fits and toterances.

EX-2 Introduction & demonstration of tools used inFitting Shop.

EX-3 Hacksawing and chipping of M.S. flat. Filing andsquaring of chipped M.S. job. Filing on square orrectangular M.S. piece.

EX-4 Making bolt & nut by tap and die set and make itsjoints

Ex-5 To drill a hole in M.S. Plate and taping the same tocreat threads as per need.

5. Foundry Work

Ex-1 Study of metal and non metals

Ex-2 Study & sketch of the foundry tools.

Ex-3 Study & sketch of cupula & pit furnace.

Ex-4 To prepare the green moulding sand and to preparemoulds (single piece and double piece pattern sweepmould)

Ex-5 Casting of non ferous (lead or aluminium) as perexercise 3.

6. Smithy Shop :

EX-1 Study & Sketch of Tools used in smithy shop.

EX-2 To prepare square or rectangular piece by the M.S.rod.

EX-3 To make a ring with hook for wooden doors.

EX-4 Utility article-to preapre a ceiling fan hook.

7. Welding Shop :

EX-1 Introduction to welding, classinfication of welding,types of weld joints.

EX-2 Welding practice-gas and electric.

EX-3 Welding for lap joint after preparing the edge.

EX-4 Welding of Butt joint after preparation of the edge.

EX-5 'T' joint welding after preparation of edge.

8. Machine Shop

EX-1 Study & sketch of lathe machine.

EX-1 Study & sketch of grinders, milling M/c, Drilling M/cand CNC Machines

Ex-2 Plain and step turning & knurling practice.

Ex-3 Study and sketch of planning/Shaping machine andto plane a Ractangle of cast iron.

SEMESTER-II

DAS-22 Mathematics - II

Unit -1:Integral Calculus-I

Methods of finding indefinite integral
1. Integration by substitution

2. Integration by parts
3. Integration by partial fraction
4. Integration of special functions

Unit-2: Integral Calculus-II

1.Definite integral: definition and properties, Evaluation of integrals
2. Applications of definite integrals: Finding areas bounded by simple curves, Length of simple curves, Volume of solids of revolution,
3.Numerical Integration: Trapezoidal rule, Simpson`s 1/3rd rule and Simpson`s 3/8 th rule

Unit-3: Coordinate Geometry-I

1.Circle : Equation of circle in standard form, centre –radius form , diameter form and two intercept form.
2. Standard form of curves and their simple properties:
Parabola
Ellipse
Hyperbola

Unit-4: Coordinate Geometry-II

1.Distance between two points in space , direction cosines and direction ratios, Finding equation of a straight line and shortest distance between two lines.
2. Sphere

[DAS-23] Applied Physics-II

1. Optics
Nature of light, Laws of Reflection and Refraction, Snell'sLaw, Interference (Constructive and Deotructive), Diffraction and Polarization (Concept Only), Law of Mallusand Polaroids.
2. Introduction To Fibre Optics :
Critical angle, Total internal reflection, Principle offibre optics, Optical fibre, Pulse dispersion in step-indexfibres, Graded index fibre, Single mode fibre, Opticalsensor.
3. Lasers and its Applications
Absorbtion and Emission of energy by atom, Spontaneous andStimulated Emission, Poluation inversion, Main component oflaser and types of laser- Ruby Laser, He-Ne laser and theirapplications. Introduction to MASER.
4. Electrostatics :
Coutomb's Law, Electric field, Electric potential, Potentialenergy, Capacator, Energy of a charged capacitor, Effect of dielectric on capacators.
5. D.C. Circuits
Ohm's Law, Kirchoff's Law and their simple application,Principle of Wheat Stone bridge and application of thisprinciple in measurement of resistance (Meter bridge andPost Office Box); Carey Foster's bridge, potentiometer.
6. Magnetic Materials and Their Properties:
Dia, Para and Ferro-magnetism, Ferrites, Magnatic HysteresisCurve and its utility. Basic idea of super conductivity, Meissner's effect.
7. Semiconductor Physics
Concept of Energy bands in soldis, classification of solidsinto conductors, insulators and semiconductors on the basis of energy band structure. Intrinsic and extrinsic semiconductors, Electrons and holes as charge carriers insemiconductors, P-type and N-type semiconductors.
8. Junction Diode and Transister :
Majority and Minority charge carriers,P-N junctionformation, barrier voltage, Forward and reverse biasing of ajunction diode, P-N junction device characteristics,Formation of transistor, transistor-action, Base, emitterand collector currents and their relationship LED's.
9. Introduction To Digital Electronics :
Concept of binary numbers, Interconversion from binary todecimal and decimal to binary. Concepts of Gates (AND, NOT,OR).
10. Non-conventional energy sources:

(a) Wind energy : Introduction, scope and significance,measurement of wind velocty by anemometer, generalprinciple of wind mill.
(b) Solar energy: Solar radiation and potentiality ofsolar radiation in India, uses of solar energy:Solar Cooker, solar water heater, solar photovoltaiccells, solar energy collector.

[DAS-23P] Applied Physics-II LAB

Note: Any 5 experiments are to be performed.
1. Determination of coefficient of friction on a horizontal plane.
2. Determination of 'g' by plotting a graph T2 verses l and usingthe formula g=4n2/Slope of the graph line
3. Determine the force constant of combination of springs incase of 1. Series 2. Parallel.
4. To verify the series and parallel combination of Resistanceswith the help of meter bridge.
5. To determine the velocity of sound with the help of resonancetube.
6. Determination of viscosity coefficient of a lubricant byStoke's law.
7. Determination of E1/E2 of cells by potentio meter.
8. Determination of specific resistance by Carry Foster bridge.
9. Determination of resistivity by P.O.Box.
10. Verification of Kirchhoff’s Law.
11. To draw Characteristics of p-n Junction diode.

[DEE-21] Basic Electrical Engg

1. Basic Terminology and their concepts
1.1 Current, EMF, potential difference (Voltage),resistance, resistivity their units conductors &insulators, Insulation resistance of a cable.
1.2 Effect of temperature on the resistance ofconductors, semiconductors (C, Si, Ge) and insulators.
1.3 Electrical power, energy and their units (SI),Heating effect of electric current and its practicalexamples.
1.4 Relationship between electrical, mechanical andthermal SI units of work, power and energy.
2. D.C. Circuits
2.1 Kirchhoff’s laws.
2.2 Simple numerical problems based on Kirchhoff’s laws.
2.3 Introduction to Thevenin and Superposition theorem,Norton's theorem
3. Batteries
3.1 Construction, chemical changes during charging anddischarging of lead acid cells.
3.1(a) Indications of a fully charged battery.
3.2 Capacity and efficiency of lead acid cell / battery.
3.3 Charging of 6 V., 12 V. commercial batteries.
3.3(a) Grouping of cells.
3.4 Care and maintenance of commercial batteries.
3.5 Problems/defects in lead acid batteries.
3.6 Concept of Nickel-Iron and Nickel Cadmimum Batteries.
3.7 Concept of solid sealed maintenance free batteries(SMF batteries), Oxygen recombination principle.
4. Capacitors
4.1 Concept of capacitor, types of capacity of parallelplate capacitor, Composite capacitor and effect ofphysical parameters.
4.1 Energy stored in a capacitor, dielectric and its influence on capacitance of a capacitor, dielectricconstant dielectric breakdown and dielectricstrength. Dielectric loss.
4.3 Series and parallel combination of capacitors.
4.3(a) Capacitance of multi-plate capacitors.
4.4 Variable capacitors.
4.5 Charging and discharging of capacitors.
4.6 Simple problems on capacitors.
5. Electromagnetism
5.1 Concept of magnetic flux, flux density, magneticfield intensity ,permeability and their units.
5.2 Magnetic circuits, concept of reluctance and mmf andsimple problems.

5.3 Analogy between electric and magnetic circuits.
5.4 B-H curve and magnetic hysteresis (No mathematical derivation).
5.5 Elementary ideas about hysteresis loss.
5.5(a) Lifting powers of a magnet.
6. Electromagnetic Induction
6.1 Faraday's laws of electromagnetic induction. Lenz'slaw, simple problem.Dynamically induced emf.
6.2 Self inducedemf, inductance, its role in electricalcircuits. Simple problems.
6.3 Mutually induced emf, mutual inductance,its role inelectrical circuits. Simple problems.
6.4 Energy stored in magnetic circuit.
6.5 Rise and decay of current in inductors.
6.6 Force on a current carrying conductor placed in amagnetic field and its applications.
6.7 Elementary idea about eddy current loss.
7. A.C.Circuits
7.1 Recapitulation of terminology, instantaneous value,maximum (peak) value, cycle, frequency, alternatecurrent and voltage. Difference between AC and DC.
7.2 Equation of an alternating voltage and currentand wave shape varying sinusoidally.
7.3 Average and RMS value of alternating voltage andcurrent. Importance of RMS value.Simple problems.
7.4 Concept of phase, phase difference and phasorrepresentation of alternating voltage and current.
7.5. A.C. through pure resistance, inductance,capacitance,phasor diagram and power absorbed.
7.6 R-L series circuit, idea of impedance and calculations.
7.7 Apparent power, reactive power and active power,powerfactor, its importance and simple problems.
7.8 R-C series circuit , simple problems.
7.9 R-L-C series circuit , simple problems.
7.10 Solution of simple parallel A-C circuits by
(a) Phasor diagram method,
(b) Admittance method.
7.11 Solution of AC circuits series/parallel by j method.
7.12 Resonance (Series and parallel) and practicalapplication, simple problems.
8. Poly-phase System
8.1 Introduction to poly-phase system. Advantage of threephase system over single phase system.
8.2 Star and Delta connections. Relationship betweenphase and line value of currents and voltage.Power inpoly-phase circuits.Simple problems of balancedcircuits only.

[DEE-21P] BASIC ELECTRICAL ENGG. LAB

i) To show the variation of resistance of a lamp withtemperature by plotting a V-I curve for 60W and 100Wfilament lamps.
ii) To verify the Kirchhoff's laws.
iii) To observe the B-H curve for a ferro-magnetic core onCRO.
iv) To find the relationship between voltage and currentfor R-L series circuit for variable resistances &variable inductance.
v) To determine the variation in the values ofinductance of a coil for different positions of themovable iron core.
vi) To measure the power factor in a single phase ACcircuit by using voltammeter, ammeter & wattmeter.
vii) To test a battery for charged and discharged conditionand to charge a battery.
viii) Verification of voltage and current relations in Starand delta connected systems.
ix) To charge and discharge a capacitor and to show thegraph on C.R.O.
x) Verification of laws of capacitors in series andparallel.

[DEC-21] Electronics – I

1. Semiconductor Diodes
Semiconductor materials N type and P Type P.N. junction,its forward and reversed biasing; junction diodecharacteristics.Diode (P-N junction) as , half wave, full wave rectifierincluding bridge rectifier, relationship between D.C. outputvoltage and A.C. input voltage, rectification efficiency andripple factor for rectifier circuits, filter circuits, shuntcapacitor, series inductor, capacitor input filter.Different types of diodes, brief idea of characteristics

andtypical applications of power diodes, zener diodes, varactordiodes, point contact diode, tunnel diodes, LEDs and photodiodes.Important specifications of rectifier diode and zener diode.

2. Bipolar Junction Transistor :

Concept of bipolar junction transistor,PNP and NPN transistors their symbols and mechanisms ofcurrent flow, explanation fundamental current relations.Concept of leakage current (I cbo) effect of temperature onleakage current.Standard notation for current and voltage polarity; CB, CE, and CC configurations. Transistor input and outputcharacteristics, concept of active, cut off and saturationregion.Common emitter configuration: current relations in CEconfiguration, collector current interms of base current andleakage current (Iceo), relationship between the leakagecurrent in CB and CE configuration, ;input and outputcharacteristics, determination of dynamic input and outputresistances and current amplification factor from thecharacteristics.

3. Single Stage Transistor Amplifier

Single stage CE amplifier with proper biasing circuitand its working as voltage amplifier. AC load line and itsuse in:

(a) Explanation of phase reversal of the output voltage withrespect to input voltage. Introduction to tuned voltage amplifier.

4. FIELD EFFECT TRANSISTOR (FET), MOSFET & CMOS

A. FET :

- Construction, operation, characteristics and Biasing ofJunction FET.
- Analysis of Single stage CB, CG and CD amplifier.

B. MOSFET :

- Construction, operation, characteristics and Biasing ofMOSFET in both depletion and enhancement modes.
- Analysis of Single stage CB, CG and CD amplifier.

C. CMOS :

- Construction, operation, characteristics of CMOS in in bothdepletion and enhancement modes.
- Use of CMOS as Invertor, Different Application of CMOS, CMOSIC.
- Comparison of JEET, MOSFET and Bipolar transistor.

5. MULTISTAGE & POWER AMPLIFIERS:

5.1 Need of multistage amplifier, different coupling schemes andtheir working, brief mention of application of each of thetype of coupling.

5.2 Working of R.C. coupled and transformer coupled multistage amplifier, approximate calculation of voltage gain andfrequency response for a two stage R-C coupled amplifier.Working principles of push pull amplifier circuits its advantages over single ended power amplifier.

6. Feedback in Amplifiers

Basic principles and types of feedback, derivation ofexpression for the gain of an amplifier employingfeedback. Effect of negative feedback on gain,.stability, distortion, and band width.(only physicalexplanation) typical feedback circuits:

(a) RC coupled amplifiers with emitter by-pass capacitorremoved.

(b) Emitter follower, complementary symmetry poweramplifier and its applications.

7. Regulated Power Supply

7.1 Concept of regulation.

7.2 Basic regulator circuits (using zener diode).

7.3 Concept of series and shunt regulator circuits.

7.4 Three terminal voltage regulator Ics (positive negative andvariable) application. Block diagram, Pin configuration andworking of popular regulator IC.

8. OSCILLATORS:

8.1 Application of oscillators.

8.2 Use of positive feedback/negative resistance for generationof oscillation, barkhawn's criterion for oscillations.

[DEC-21P] ELECTRONICS I LAB

1. Semiconductor diode : identification of types of packages,terminals and noting different ratings using data books forvarious types of semiconductor diodes (germanium, pointcontact, silicon low power and high power and switching diode).

2. Rectifier circuits using semiconductor diode measurementof input and output voltage and plotting of input and outputwave shapes:

i) Half wave rectifier

ii) Full wave rectifier (centre tapped and bridgerectifier circuits).

3. Plot the waveshapes of a full wave rectifier with shuntcapacitor, series inductor, and filter circuit
4. Single stage common emitter amplifier circuit
i) Measurement of voltage gain at 1 KHZ for differnetload resistances.
ii) Plotting of frequency response of a single stageamplifier circuit.
iii) Measurement of input and output impedance of theamplifier circuit.
5. To measure the overall gain of two stage R.Ccoupled amplifier at 1 KHZ and note the effect ofloading of second stage on the first stage.
6.(a)To plot the laod Vs output powercharacterstic to determine the maximum signal inputfor undistorted signal output.
(b) The above experiment is to be performed with single endedpower amplifier, transistorized push pull amplifier. Complementary symetry power amplifier.
7. To observe the effect of a bye-pass capacitor by measuringvoltage gain and plotting frequency response for a single stage amplifier.
8. To measure input and output impedance of a feedbackamplifier with and without by-pass capacitor.
9. Measurement of voltage gain, input and outputimpedance and plotting of frequency response of an emitterfollower circuit.
10. Plot the FET characteristics and determination of itsparameters from these characteristics.
11. To test adjustable IC regulator and current regulator.
12. Identification of Some Popular IC of 74 and 40 series withPin Number and other details.
13. Application and use of Multimeter, CRO, Audio Oscillator andPower Supply (D.C.)

[DDW-21] ENGINEERING DRAWING

1. Drawing, instruments and their uses.

1.1 Introduction to various drawing, instruments.

1.2 Correct use and care of Instruments.

1.3 Sizes of drawing sheets and their layouts.

2. (a) Lettering Techniques 1 Sheet

Printing of vertical and inclined, normal singlestroke capital letters.Printing of vertical and inclined normal singlestroke numbers.Stencils and their use.

(b) Introduction to Scales 2 Sheet

Necessity and use, R FTypes of scales used in general engineering drawing.Plane, diagonal and chord scales.

3. Conventional Presentation: 2Sheet

Types oflines, Conventional representation of materials,Thread (Internal and External), Conventional representation of machine parts,Welded joint.

4. (a) Principles of Projection 1 Sheet

Orthographic, Pictorial and perspective.Concept of horizontal and vertical planes.Difference between I and III angle projections.Dimensconing techniques.

(b) Projections of points, lines and planes. 2Sheet

5 (a) Orthographic Projections of SimpleGeometrical Solids 3 Sheet

Edge and axis making given angles with the referenceplanes. Face making given angles with referenceplanes. Face and its edge making given angles withreference planes.

(b) Orthographic views of simple composite solids fromtheir isometric views.

(c) Exercises on missing surfaces and views

6. Section of Solids 2 Sheet

Concept of sectioningCases involving cutting plane parallel to one of thereference planes and perpendicular to the others.Cases involving cutting plane perpendicular to one ofthe reference planes and inclined to the others plane,

true shape of the section

7. Isometric Projection. 1 Sheet

Isometric scaleIsometric projection of solids.

8. Free hand sketching 1 Sheet

Use of squared paperOrthographic views of simple solidsIsometric views of simple job like carpentry joints

9. Development of Surfaces 2 Sheet

Parallel line and radial line methods ofdevelopments.Development of simple and truncated surfaces (Cube,prism, cylinder, cone and pyramid).

10. ORTHOGRAPHIC PROJECTION OF MACHINE PARTS: 3Sheet

Nut and Bolt, Locking device, Bush Bearing

11. PRACTICE ON AUTO CAD : 2 Sheet

Concept of AutoCAD, Tool bars in AutoCAD, Coordinate System,Snap, Grid and Ortho mode. Drawing Command - Point, Line,Arc, Circle, Ellipse. Editing Commands - Scale, Erase, Copy,Stretch, Lengthen and Explode. Dimensioning and Placing textin drawing area. Sectioning and hatching. Inquiry for different parameters of drawing.

NOTE :

A. The drawing should include dimension with tolerance wherever necessary, material list according to I.S. code.

25% of the drawing sheet should be drawn in first angleprojection and rest 75% drawing sheet should be in thirdangle figure

B. Practice on AutoCAD latest software is to be done in AutoCADlab of Mechanical Engineering Department of the Institute.

SECOND YEAR

SEMESTER-III

DAS-31APPLIED MATHEMATICS III

1. MATRICES:

1.1 Algebra of Matrices, Inverse:Addition, Multiplication of matrices, Null matrix and a unitmatrix, Square matrix, Symmetric, Skew symmetric, Hermitian,Skew hermition, Orthogonal, Unitary, diagonal and Triangularmatrix, Determinant of a matrix.Definition and Computation of inverse of a matrix.

1.2 Elementary Row/Column Transformation:Meaning and use in computing inverse and rank of a matrix.

1.3 Linear Dependence, Rank of a Matrix :Linear dependence/independence of vectors, Definition andcomputation of a rank of matrix. Computing rank throughdeterminants, Elementary row transformation and through theconcept of a set of independent vectors,Consistency ofequations.

1.4 Eigen Pairs, Cayley-Hamilton Theorem : Definition and evaluation of eign values and eign vectors ofa matrix of order two and three, Cayley-Hamilton theorem(without Proof) and its verification, Use in finding inverseand powers of a matrix.

2. DIFFERENTIAL CALCULUS :

2.1 Function of two variables, identification of surfaces inspace, coincides

2.2 Partial Differentiation :Directional derivative, Gradient, Use of gradient f, Partialderivatives, Chain rule, Higher order derivatives, Eulenstheorem for homogeneous functions, Jacobians.

2.3 Vector Calculus :Vector function, Introduction to double and triple integral,differentiation and integration of vector functions,gradient, divergence and curl, differential derivatives.

3. DIFFERENTIAL EQUATION :

3.1 Formation, Order, Degree, Types, Solution :Formation of differential equations through physical,geometrical, mechanical and electrical considerations,Order, Degree of a differential equation, Linear, Nonlinearequation.

3.2 First Order Equations :Variable separable, equations reducible to seperable forms,Homogeneous eqution, equations reducible to homogeneousforms, Linear and Bernoulli form exact equation and theirsolutions.

3.3 Higher Order Linear Equation :Property of solution, Linear differential equation withconstant coefficients (PI for X=eax, Sin ax, Cos ax, Xn,eaxV, XV.

3.4 Simple Applications :LCR circuit, Motion under gravity, Newton's law of cooling,radioactive decay, Population growth, Force vibration ofa mass point attached to spring with and without dampingeffect. Equivalence of electrical and mechanical system
4. INTEGRAL CALCULUS - II:
4.1 Beta and Gamma Functions :Definition, Use, Relation between the two, their use inevaluating integrals.
4.2 Fourier Series :Fourier series of f(x),-n<x<n, Odd and even function, Halfrange series.
4.3 Laplace Transform :Definition, Basic theorem and properties, Unit step andPeriodic functions, inverse Laplace transform, Solution ofordinary differential equations.
5. PROBABILITY AND STATISTICS :
5.1 Probability :Introduction, Addition and Multiplication theorem and simpleproblem.
5.2 Distribution :Discrete and continuous distribution, Binomial Distribution,Poisson Distribution, Normal Distribution.

[DEE-33] ELECTRICAL ENGINEERING-II

DETAILED CONTENTS

1.0 A.C.THEORY
1.1 Representation of sinusoidal quantities by phasors.
1.2 Physical explanation of the phase relationship between voltage and current when sinusoidal alternating voltage is applied across:-
(a) Pure resistance,
(b) Pure inductance and
(c) Pure capacitance.
1.3 Explanation of inductive reactance, capacitive reactance and their significance.
1.4 Relationship between voltage and current when alternating voltage is applied to :-
(a) Resistance and inductance in series,
(b) Resistance and capacitance in series.
1.5 Solution and phasor diagrams for simple R-L-C circuits (Series and parallel); Impedance, Impedance triangle, phase angle.
1.6 Power in pure resistance, inductance and capacitance; power in combination of R-L-C circuits; power factor.
1.7 Active and reactive currents and their significance; practical importance of power factor.
1.8 Series and parallel resonance in R-L-C circuits, Q-factor of coils and capacitance.
2. THREE PHASE SUPPLY:
2.1 Elementary idea about 3-phase supply.
2.2 Star and delta connection. Relationship between phase and line voltage and currents.
2.3 Power and power factor in three phase system and their measurement.
2.4 Comparison between three phase and single phase supply.
3. TRANSFORMERS:
3.1 Principle of operation.
3.2 E.M.F equation, Voltage & Current relations.
3.3 Construction and applications of small transformers used in electronics and communication engg., construction of auto transformers, constant voltage transformer.
3.4 Phasor diagram of a transformer on load; Definition of regulation and efficiency; Elementary idea of losses in transformer, open circuit and short circuit test.
4. D.C. MACHINES:
(a) D. C. Generator: Working principle, constructional details, e.m.f equation, types of generators and their applications.
(b) D. C. Motor: Working principle, back e.m.f., types of D. C. motor and elementary idea of their characteristics, torque equation, methods of speed control (Description only).
(c) Starters for D.C. Machines
5. SYNCHRONOUS MACHINES:
(a) Alternators: Working principle, types of alternators, constructional details. e.m.f. equation, condition for parallel operation.
(b) Synchonous Motors: Working principle, construction details, vector diagram, effect of excitation on armature current and power factor, synchronous condenser.
(c) Application of synchonous machines.
6. INDUCTION MOTORS:
(a) Three Phase Induction Motor:
Working principle and constructional details, types of induction motor, slip ring and squirrel eage, slip in induction motors, speed torque characteristics, starting and speed control, application of induction motors in industry.

(b) Single Phase Induction Motor: Principle of operation and constructional details of single phase FHP induction motors (Split phase, capacitor start capacitor run, shaded pole, reluctance start, A.C. series, universal, hysterisis, servo and stepper motors their applications).
(c) Starters for Induction motors.

[DEE-33P] ELECTRICAL ENGINEERING-II LAB

List Of Experiments
1. To verify that in an A.C. circuit, the phasor sum (not the algebraic sum) of currents at any junction is zero.
2. To find the voltage-current relationship in a R-L series circuit and to measure power and power factor of the circuit.
3. To find for a filament lamp :-
(a) Variation of resistance with temperature.
(b) Variation of temperature with voltage.
(c) Variation of resistance with voltage.
(d) Variation of power with voltage.
4. To measure power and power factor in three phase system by two wattmeter method.
5. To determine the efficiency and regulation of a transformer by performing direct loading.
6. To measure the induced emf of separately excited D.C. generator as a function of field current.
7. To measure the terminal voltage of a separately excited D.C. generator as a function of load current.
8. To measure the terminal voltage of a D.C. shunt generator as a function of load current.
9. To measure the speed of a separately excited D.C. motor as a function of load torque at rated armature voltage.
10. To observe the difference in the starting current at switching on single phase capacitor start induction motor with :-
(a) The capacitor disconnected and
(b) The capacitor connected. Also to determine how to reverse the direction of rotation.
11. To start a Three Phase induction motor and to determine its slip at various loads.
12. To determine V curves of a synchronous motor.

[DEC-31]INDUSTRIAL ELECTRONICS AND TRANSDUCERS

DETAILED CONTENTS
1. THYRISTORS AND THEIR APPLICATIONS
1.1 Name, symbol and typical applications of members of thyristor family.
1.2 SCR, Triac and Diac-Basic structure, operation, V-I characteristics and ratings, gate circuits, ratings, triggering process and triggering circuits, turn off methods and circuits, selections of heat sinks, mounting of thyristor on heat sinks, basic idea of protection of thyristor circuits.
1.3 Operation, V-I characteristics, equivalemt circuit and parameters of an UJT: Description of UJT relaxation oscillator, use of UJT relaxation oscillator for triggering thyristors.
1.4 Diac SCR and Triac switching circuits like automatic battery charger, voltage regulator, emergency light, alarm circuits, time delay relay circuits and circuits for over current and over voltage protection.
1.5 Single phase, various types of phase controlled rectifiers using SCR for resistive and inductive load explanation using waveshapes and appropriate mathematical equation (No derivation). A.C. phase control using SCRs and triacs, Application of phase controlled rectifiers and A.C. phase control circuits in illumination control, temperature control, variable speed drives using d.c. moters and small a.c. machines.
1.6 Half wave, full wave (including bridge) poly phase rectifiers using SCRs; explanation using wave shapes and formula (no derivation). Operation of three phase bridge controlled rectifier and its applications.
1.7 Principle of operation of basic inverter circuits, basic series and parallel commutated inverters, principle of operation of cycloconverter, choppers and dual converter, mention of applications.
2. PRINCIPLES AND APPLICATIONS OF INDUCTION AND DIELECTRIC HEATING (No Mathematical Treatment)
Introduction, improtance of heating in industry, Principle of induction heating, Industrial applications of induction heating, Principle of dielectric heating, Industrial applications of dielectric heating.
3. TRANSDUCERS:
Basic idea and principle of operation and their use in measuring physical parameters of the following types of transducers. Transducer Typical Applications
3.1 Varible Resistance Type Potentiometric Resistance Displacement and force strain gauge. Torque and Displacement. Resistance Thermometer. Temperature. Thermister. Temperature.
3.2 Variable Capacitance Type Variable capacitance Displacement and pressure. pressure gauge. Capacitor microphone. Speed, noise Dielectirc gauge. Liquid level & Thickness.
3.3 Variable Inductance Type Differential Transformer. Pressure, force, displacement and position. Magnetostrication gauge. Force, pressure, sound.
3.4 Piezoelectric Type Crystal Microphone, Crystal Oscillator
4. PROCESSING OF TRANSDUCER SIGNALS:
4.1 Characteristics of instrumentation amplifiers in respect of input impedance, output impedance, drift, dc offset, noise,

gain common mode rejection, frequency response etc. Relating the suitability of these characteristics for amplifying signals from various transducers.
4.2 Block diagram and basic concept of open loop and closed loop systems.
5. OPTOELECTRONIC DEVICES:
5.1 Basic principle and characteristics of photo sources and photo detector, Photo resisters, photo diodes, photo transistors, photo electric cells, LCDs, LEDs and photocuoplers.
5.2 LED- Material, Construction, Working, Power & Efficiency, Charactistics and modulation BW. Laser, Semiconductor Laser
5.3 Photo Detectors - Optical detection Principles, P-N photodiode, Avalanche Photodiode.
5.4 Electro-Optic Effect- Integrated optical Devices, Magneto- Optic Effect, Acousto-Optic Effect.
5.5 Sensors & Display Devices - Optical Fiber Sensors, Display Devices, LCD display, Numeric Display.
(Only Brief description of above)
LIST OF BOOKS
1. M. H. Rashid-" Power Electronics Circuits, Devices & Application"- P.H.I
2. J. Michael Jacob - " Power Electronics : Principle and Application" - Viks Publishing House Pvt. Ltd.
3. Singh Jasprit - " Optoelectronics An Introduction to Materials and Devices" - McGraw-Hill
4. C. S. Ranjan- "Instrumentation Devices & Systems"- Tata McGraw Hill.

[DEC-31P] INDUSTRIAL ELECTRONICS AND TRANSDUCERS LAB

List Of Experiments
1. Identification of various types of packages and terminals of various low and high power thyristors (SCR and Triac).
2. To determine and plot firing charateristics of SCR :-
(a) By varying the anode to chathode voltage.
(b) By varying the gate current.
3. Observing voltage waveshapes at various points of UJT relaxation oscillator circuit.
4. Observation of waveshapes at relevant points of the circuit of a single phase controlled rectifier using SCR and UJT relaxation oscillator.
5. To determine the firing characteristics of Triac in different mode i.e. Mode-I (plus), Mode-I (minus), Mode-III (plus), Mode-III (minus).
6. Observe the waveshapes and measure a.c. and d.c voltage at various points of a three phase bridge rectifier circuit.
7. Observe the waveshapes and measure a.c. and d.c. voltage at various points of a three phase SCR controlled bridge rectifier circuit.
8. Test an a.c. phase control circuit using triac and observe waveshapes and voltages at relevant points in circuit (while using for lamp intensity control and/or a.c. fan speed control).
9. To study the working of a single phase SCR/ transistor inverter circuit by observing waveshapes at input and output.
10. To measure force and pressure by using strain gauge transducer.
11. To observe the working of crystal microphone.
12. To observe the working principle of following devices in practical circuit :-
(a) Light Dependent Resistor (LDR).
(b) Photo electric cell.
(c) LED and LCDs.
(d) Avalancha Photodiode
(e) Optical fibre sensor
13. To measure voltages at different points of a circuit using a light sensitive device as ON-OFF control.

[DCS-32] PROGRAMMING IN C & C++

DETAILED CONTENTS
1. CONCEPT OF PROGRAMMING: Concept of Flowcharing, algorithm,programming, Structured Programming Various techniques of programming, Use of programming.
2. Programming in C: Data Types, Operators and Expressions;Input & Output printf, scanf, clibrary Control Statement: IF- ELSE, While, For, Do- While, Switch; Functions and modular programming; Scope of variables, parameter passing, recursion, block structure; preprocessor statements; pointers and arrays; structures and unions; File handling.

3. CLASSES & OBJECT: What is a class, what is an object, constructors, types of object (external, automatic static, Dynamic objects) Metaclass, role of meta class. Scope of classes, array of objects, objects as a function argument.
4. Programming in C++: What is object-orientation, area of object technology, C++, getting to grips with C++(data types, escape sequence, characters, variables, operator, notation, Arrays, Function conditional statements. call by value, call by reference. Pointer : C++ memory map, dynamic allocation pointers, pointers with arrays. Structure, structure with arrays, passing, structure of function. Enumerated data types, Inherentance, apolymorphism & Overloading.

PROGRAMMING IN C & C++

List of Experiments

1. Exercises involving output and input format controls in Pascal.
2. Exercises involving control transfer statements in C & C++
3. Exercises with arrays & Pointers in C & C++.
4. Exercises with functions in C & C++.
5. Exercises with files in C & C++.

[DEC-35P] ELECTRONICS WORKSHOP

PART-A ELECTRICAL WORKSHOP

GENERAL OBJECTIVES

After the completion this course the learner will be able to

1. Become familiar with domestic and semi-domestic industrial wiring practice.

INSTRUCTIONAL OBJECTIVES

After completing this course the learner will be able to

1. Plan and Wire a small domestic building given the load requirement.
2. Specify the wiring planes of semi-insdustrial installations with three phase supply and a maximum of 5 KVA load.

Exercises To Be Performed No. of turns reqd.

1. Identification and study of commonly used 1 electrical material such as wires, cables, switches, fuses, coiling, roses, battens, cleats and allied items.
2. Identification and study of various tools 1 used in Electrical Workshop and safety measures.
3. Making connection of single lamp and three 1 pin plug socket to supply using batten wiring.
4. Making Electrical connection for staircase 1 wiring.
5. Making Electrical connection for a tube light 1 and door bell.
6. Wire a mains outlet pannel consisting of a 1 specified combination of 5 AMP; 15 AMP, Socket, Main switch, Indicating lamp and Fuse links.
7. Given the load requirements, prepare the 2 wiring diagram for a small Electronic/ Electrical Laboratory/ Workshop using energy meter, MDB and SDBS and details of sub-circuits, Protective device, cables/wires should be specified. The wiring should assume the availability of 3 phase 4 wire mains supply near the laboratory/workshop.

PART-B. ELECTRONICS WORKSHOP

GENERAL OBJECTIVE

After completion of instruction in this subject the student wiil :-

1. Develop skill in selection and use of commonly used tools, equipment, components in a given situation.
2. Develop skill in wiring, soldering and desoldering works.
3. Develop skill in tracing circuits of simple (analouge and digital) electronic assembly.

INSTRUCTIONAL OBJECTIVE

After completion of instruction in the subject the student will be able to :-

1. State the correct name and function of different tools and accessories, such as :-

Tools

Pliers, Wire cutter, Wire stripper, Tweezer, Soldering iron, Desoldering tools, Neon tester and Screw drivers.

Accessories

1. Including Tapes, Solders, Solders tips, Fluxes; De-soldering wick, Solder cleaning fluids, Sleeves, Tags.
2. Demonstrate the correct use of accessories mentioned in (1) above.
3. Selection and use of general purpose Electronic test and measuring equipemnt :-

3.1 Given any of the wavefrom generators specified in equipment type (a) below with its controls set at random, the student should be able to operate/adjust the necessary control to demonstrate/any desired waveform on the appropriate measuring equipment, specified in (b) below.

3.2 Given any measurement Parameter for being measures: equipment specified in Amplitude, Frequency phase

(b) below (with its Time Period, Rise and Fall controls set at random) time of pulse Wavefrom, common
the student should be transistor parameters, circuit able to operate adjust resistance. the necessary controls to measure/display electrical parameter(s) such as specified on the right side margin.
3.3 Given different type of power supply mention in (c), the student should be able to find out the operating range and regulate the power supplies Equipment Type.
(a) Test Wavefrom Generator :- Audio oscillator, Function Generator, Signal Generator, Spectrum Analyzer.
(b) Measurement Equipment ; Single beam CRO, Double beam/Dual trace CRO, electronic and Digital multimeters, Transistor tester/Curve tracer, IC tester etc.
(c) Power Supply - UPS, Invertor, DIfferent types of DC/AC power supplies
4. Students should be able to identify and use the item mention below (a), (b), (c) and (d).
(a) Various types of Single/Multicored, Insulated screened, Power type/ Audio/ Video/ General purpose wires and cables.
(b) Various types of plugs, sockets, connectors suitable general purpose audio, vidio use. Some of such commectors are : Banana plug and Sockets, ENC, DIN, UHF, VHF, Earphone connectors, Telephone jacks and similar male and female connectors and terminal strips.
(c) Various types of switches such as : Normal/miniature Toggle, Slide, Push botton, Piano key rotary, SPST, DPDT, Band selector multiway, Master main switch.
(d) Various types of protective devices such as : Wire fuse, Cartridge fuse, Single/Multiple miniature circuit breakers over and under current relays.
5. Exercises to be performed :
i. Study and testing of different types of Resistor, Capacitor, Inductor, Diode, Transistor (BJT, FET, MOS, CMOS) and ICs (All Popular Faimlies).
ii. Study of different processes by performing in assembling- Soldering, Dsoldering, Cutting, Stripping and connecting.
iii. Study of equipment - their control and operation mentioned in no. 3 part of accessories.
iv. Study of the items mentioned in part 4-a,b,c,d by using them in different types of circuits.
v. Students should design and assemble at least seven working circuits (Full Fabricated Form) selecting at least three from each group A and B given below
Group A
1. Single Stage Amplifier
2. Halfwave and Full Rectifier
3. Filters
4. RC Coupled Amplifier
5. Power Amplifier (Push Pull)
6. Tuned Amplifier
7. Oscillator
8. Waveshaping Circuits
Group B
1. Clap Switch
2. Door Bell
3. Burglar Alarm
4. Porch Light
5. Water level Indicator
6. Fan regulator
7. 25 Kva Manual Stablizer
8. Single band transistor radio receiver
Note :
1. The above list of Group B suggestive, more items may be added to the list depending upon students choice and materials availablity but the item should belong consumers interest category.
2. Student should be encouraged for self market survey for each material.
PART-C PREPARATION OF PRINTED CIRCUIT BOARDS
Instructional Objective
*
After the completion of instruction in this area of the subject the learner will able to :-
1. Acquire skill in silk screen printing techniques for the purpose of making the printed circuits boards.
2. Acquire knowledge of non dry-method of PCB making using photoprocessing techniques.
3. Acquire skill in preparing, checking, drilling and proper storing PCBs.
Suggested Task/Exercises No. of turns required.

1. Familiarisation with tools, equipment, 1 materials and processes of a single and double sided PCB making using direct etching method (Artwork to done by students) .
2. As above expect using photoprocessing 2 techniques.The initial exposure is to include the following
2.1 Dark Room Practice.
(a) Exposure using UV light/daylight
(b) Developing (including dye developing)
(c) Fixing
(d) Printing (including contact printing)
(e) Enlarging/Reducing
2.2 Techniques of photo-resist coating.
2.3 Baking and cleaning procedures.
2.4 Etching procedures.
2.5 Procurement and storage of materials and equipment.
2.6 Safety rules for PCB laboratory and darkroom.
3. Exercises in making simple single and double 2 sided PCB using direct etching method.
4. Exercises in making single and double sided 2 PCB using photoprocessing method.
5. Familiarisation with tools equipments, 2 materials and process of silk screen printing for PCB making.
6. Exercises in PCB making using silk screen 2 printing techniques.
7. Exercises in drilling, assembling and testing 1 of single and double sided PCB; proper storage of PCBs.

SEMESTER-IV

[DEC-42] NETWORKS, FILTERS & TRANSMISSION LINES

1. REVIEW OF NETWORK THEOREMS:
Review of the following, network theorem; superposition, Thevenin's Norton's and maximum power transfer.
2. NETWORKS:
2.1 One Port Network : Series and parallel tuned circuit,expression for their impedance at any frequency and atresonance in terms of Q and component values (L. C. & R).Band width of tuned circuit in terms of resonance frequencyand Q.
2.2 Two Port (Four Terminals Networks : Basic concept of thefollowing terms :
(a) Symmetrical and asymmetrical networks.
(b) Balanced and unbalance network,
(c) T-network, Ladder network, Lattice network, L Network,
Bridge T-network.
(d) Representation of a two port " Block Box" in terms ofZ, Y and H parameters and mention of application totransistor as a two port network.
3. SYMMETRICAL AND ASYMMETRICAL NETWORK :
3.1 Symmetrical Network :(a) Concept and significance of characteristics impedance,propagation constant,attenuation constant, phase shiftconstant and insertion loss.
(b) Expression for characteristic impedance, propagationconstant, attenuation constant and phase-shift constantin terms of Zo, Zoc and Zsc for the following
(i) T Network.
(ii) n (pi) Network.
3.2 AsymmetricalNetwork :
(a) Concept and significance of iterative impedance imageimpedance, image transfer constant and insertion loss.
(b) The half section (L-section) : Splitting of symmetricalT & n(pi) sections into half sections, derivation ofiterative impedence, image impedence open and shortcircuit impedance of half section.
3.3 Star-Delta Transformation : Equivalence of T and n(pi) network.
4. ATTENUATORS:
4.1 Units of attenuation (decible and nepers)

4.2 General characteristics of attenuators.
4.3 Analysis and design of simple attenuator of following types
(a) Symmetrical T and n type.
(b) L type.
5. FILTERS:
5.1 Brief idea of the uses of filters networks in differentcommunication system.
5.2 Connecting of low pass, high pass, band pass and band stopfilters.
5.3 Theorem connecting attenuation constant a and characteristics impedance (Zo) determination of cut offfrequency constant K section.
5.4 Prototype filter section
(a) T and n low pass filter section.- Reactance frequency characteristics of low pass and itssignificance.
- Attenuation Vs frequency; phase shift Vs frequencycharacteristics impedance Vs frequency of T and n.
- Simple design problems of prototype low pass section.
5.5 Active Filter:
Basic Concept of active filter and comparison with passive.(a) Op. amp. intergrater circuit, basic low pass activefilter, First and Second order low pass Butter worthfilter - Frequency response.
(b) Op. amp. differentiator circuit, basic high pass activefilter, First and Second order high pass Butter worthfilter- Frequency response.
(c) Basic concept of band pass filter, Wide and narrow bandpass active filter.
(d) Basic concept of band reject filter, wide and narrowband reject filter.
(e) All pass filter, Frequency response
5.6 Crystal Filter :
(a) Crystal and its equivalent circuit.
(b) Design properties of piezoelectric filters and theiruse.
5.7 Equalizers :General Introduction.
6. TRANSMISSION LINE:
6.1 Transmission lines and their application : Shapes ofdifferent types of transmission lines; including 300 ohmantenna feeder cable, 75 ohm co-axial cable, optical fibrecable, Also other different types of cables.
6.2 Distributed (or primary) constants of a transmission lineequivalent circuit of infinite line;
6.3 Necessity of the concept of an infinite line; Definition ofcharacteristic impedance of line ; concept of short line termination in Zo currents no voltages long an infiniteline; graphical representation; propagation constant,attenuation and phase shift constant of the line.
6.4 Relationship of characteristics impedance, propagation constant, attenuation constant and phase constant in term ofdistributed constants of the line, smith charts.
6.5 Conditions for minimum distortion and minimum attenuation ofsignal on the line; necessity and different methods ofloading the communication lines.
6.6 Concept of reflection and standing waves on a transmissionline; definition of reflection coefficient in terms ofcharacteristics impedance and load impedance; Definition ofstanding wave ratio (SWR), relation between VSWR and
voltage reflection coefficient, maximum impedance on a linein term of characteristics impedance and VWSR.
6.7 Transmission line equation; expression for voltage, currentand impedance at a point on the lines for lines with and without losses. Expression for the input impedance of theline.Solving Transmission line problems using Smith Chart.
6.8 Input impedance of an open and short circuited line and itsgraphical representation.
6.9 Transmission line at high frequency, effect of highfrequencies on the losses of a transmission line;Application of transmission line as a reactive components and impedance transformer (e.g. quarter wave andhalf wave transformer).
6.10 Principle of impedance matching using single stub;comparison of open and short circuit stubs.
6.11 Expression for characteristic impedance of open wire andcoaxial lines (No derivation).
LIST OF BOOKS
1. J. P. Ryder-Network Filters & Transmission Line- PHI
2. A. Chakravorty- An Introduction to Network, Filters &Transmission Line- Dhanpat rai & Co.
3. D. R. Chaudhry- Network Analysis-Dhanpat Rai & Co.

[DEC-42P]NETWORK, FILTERS AND TRANSMISSION LINES LAB

List of Experiment

1. Experimental verifications of the Thevenin's and Norton'stheorem with an a.c. source.
2. Experimental verifications maximum power transfer theorem.
3. To measure the characteristics impedance of a symmetrical T/n(pi) network.
4. To measure the image impedance of a given asymmetrical T/n(pi) networks.
5. To design and measure the attenuation of a symmetricalT/n(pi) type attenuator.
6. For a prototype low pass filter :

(a) Determine the characteristics impedance experimentally.

(b) Plot the attenuation characteristics.

7. For a prototype high pass filter :

(a) Determine the characteristics impedance experimentally.

(b) To plot the attenuation characteristic.

8. (a) To plot the impedance characteristic of a prototypeband pass filter.

(b) To plot the attenuation characteristic of a prototypeband pass filter.

9. (a) To plot the impedance characteristic of m-derived lowpass filter.

(b) To plot the attenuation characteristic of a m-derivedhigh pass filter.

10. To design Ist order and IInd order active LPF filter using
IC 741 and draw the frequency response curve.
11. To design Ist order and IInd order active HPF filter using
IC 741 and draw the frequency response curve.
12. Measurement of characteristics of a short transmission line.
13. Measurement of L & C of lossless transmission line.
14 Measurement of Zo of lossless transmission line.
15. Measurement of Attenuation of lossless transmission line.

[DEC-43] ELECTRONIC DEVICES AND CIRCUITS

1. SINGLE STAGE AMPLIFIERS:

1.1 Transistor hybrid low frequency model in CE configuration,'h' parameter and their physical significance, typical values of 'h' parameters and their determination bytransistor characteristics.

1.2 Expressions for voltage gain, current gain, input andoutput impedance for a single stage CE amplifier circuit in'h' parameters, appropriate approximations.

2. MULTISTAGE TRANSISTOR AMPLIFIERS:

2.1 Need of multistage amplifier, different coupling schemes andtheir working, brief mention of application of each of thetype of coupling.

2.2 Working of R.C. coupled and transformer coupled multistageamplifier, approximate calculation of voltage gain for a twostage R-C coupled amplifier.

2.3 Frequency response of R-C coupled and transformer coupledamplifiers and its physical explanation, definition andphysical significance of the term as bandwidth, upper andlower cross over frequencies etc.

2.4 Direct coupled amplifier and its limitations differentialamplifier typical circuits diagram and its working.

3. TRANSISTOR AUDIO POWER AMPLIFIERS:

3.1 Difference between voltage and power amplifier, importance of impedance matching in power amplifier, collector efficiency of power amplifier.

3.2 Typical single ended power amplifier and its working,graphical method for calculation of output power, heatdissipation curve and importance of heat, sinks, class A,class B, class C amplifier (without derivation).

3.3 Working principle of push pull amplifier and circuits, itsadvantages over single ended power amplifier, cross over distortion in class B operation and its reduction,different driver stages for push pull amplifier circuit.
3.4 Working principle of complementary symmetry push pullcircuit and its advantages.
3.5 Boot strap technique in amplifiers.
3.6 Transformer less audio power amplifiers and their typicalapplication.
3.7 Mention of at least one popular IC with its block diagram,Pin configuration and it working of each type of power amplifier.
4. FEED BACK AMPLIFIERS:
4.1 Basic principle and types of feedback.
4.2 Derivation of expression for the gain of an amplifier employing feedback.
4.3 Effect of negative feedback on gain, stability, distortionand band width (Only physical explanation)
4.4 Typical feedback circuits :
(a) A.C. coupled amplifiers with emitter by-pass, capacitorremoved.
(b) Emitter follower and its application, simplemathematical analysis for voltage gain and inputimpedance of above circuits.
5. TUNED VOLTAGE AMPLIFIERS:
5.1 Classification of amplifiers on the basis of frequency.
5.2 Review of basis characteristics of tuned circuits, (Seriesand Parallel)
5.3 Single and Double tuned amplifier, their working principles& frequency response (no mathematical derivation).
5.4 Staggered tuned amplifier and typical applications in brief.
5.5 Mention of at least one polular IC with its block diagram,Pin configuration and it working of each type of Tuned amplifier.
6. SINUSOIDAL OSCILLATORS:
6.1 Application of oscillators.
6.2 Use of positive feedback/negative resistance for generationof oscillation, barkhawn's criterion for oscillations.
6.3 Different oscillators circuits, tuned collector, Hartley,colpitts, phase shift, Wien's bridge and crystal oscillatorand their working principles (no mathematical derivation).
6.4 Mention of at least one polular IC with its block diagram,Pin configuration and it working of each type of oscillators.
7. WAVESHAPING CIRCUITS:
7.1 General idea about different wave shapes.
7.2 Review of transient phenomena in R-C and R-L circuits.
7.3 R-C and R-L differentiating circuits and integratingcircuits.
Their applications (physical explanation forsquare/rectangular input waveshapes only).
7.4 Diode clippers series and shunt biased type double clippercircuits.
7.5 Zener diode clipper circuits.
7.6 Use of transistor for clipping.Diode clamping circuit for clamping to negative peak,positive peak or any other levels for different inputwaveforms (e.g sine, square, triangular).
8. MULTIVIBRATOR CIRCUITS:
8.1 Ideal transistor switch; explanation using C.E. outputcharacteristics, calculation of component values (collector and base resistors) for a practical transistor switch.
8.2 Transistor switching time. Use of speed up capacitor(Physical explanation).
8.3 Basic concept of working of collector coupled bistable,monostable and stable multivibrator circuits includingprinciple of triggering.
8.4 Operation of Schmitt trigger, calculation of upper triggerpotential (UTP) and lower trigger potential (LTP).
8.5 Mention of applications of multivibrators and Schmittrigger. Its use as waveform generator.
8.6 Transistorised voltage controlled oscillator (basic)principle only.
8.7 Mention of at least one polular IC with its block diagram,Pin configuration and it working of each type of Multivibrator circuits.
9. OPERATIONAL AMPLIFIERS:
9.1 Specifications of ideal operational amplifier and its blockdiagram.

9.2 Definition of inverting and noninverting inputs,differential voltage gain and input and output off set,voltage input offset current, input bias current, commonmode rejection ratio (CMMR), power supply rejection ratio(PSRR) and slew rate.

9.3 Method of offset null adjustments, use of op.amp. as an inverter scale changer, adder, subtractor, differentialamplifier, buffer amplifier, differentiator, integrator,comparator, Schmitt Trigger, Generation of Square andTriangular Waveform, log and anti-log amplifiers, PLL andits application and IC power amplifier.

9.4 IC OP-AMP Application :

Inverting/Noninverting VCVS integrators, DifferentiatorsCCVS and VCCS instrumentation amplifiers, Active filter (LP,HP and Notch), Oscillators. Log/Antilog modules, Precisionrectifier, Peak detector, Sample and Hold Circuit, IC analog multiplier application, Analog multiplexer anddemultiplexer.

10. Timer Ic.:Block diagram of Ic timer (such as NE 555) and its working,use of 555 timer as monostable and astablemultivibrator,and waveform generator.

11. Regulated Power Supply

11.1 Concept of regulation.

11.2 Basic regulator circuits (using zener diode).

11.3 Concept of series and shunt regulator circuits.

11.4 Three terminal voltage regulator Ics (positive negative andvariable) application. Block diagram, Pin configuration andworking of popular regulator IC.

11.5 OP-AMP regulators, IC regulators, Fixed Voltage regulators,(78/79, XX) 723 IC regulators (Current Limiting, CurrentFold Back), SMPS.

12. Introduction to Microelectronics-

- Advantages of integration, Tyes of integrated circuits,Monolithic and Hybrid circuits.
- Different stages of fabrication of ICs- EpitaxialGrowthh, Oxidation and film deposition, Diffusion andIon Inplatation, Lithography & Etching. (Only briefidea of all)
- Masking, Selective doping, Fine-line lithography andisolation for Monolithic circuits.
- Introduction to monolithic device elements such as BJT,MOS, transistor and integration of other circuit elements.
- Very large scale ingegration (V.L.S.I.).

LIST OF BOOKS

1. Bhargava, Kulshreshtha& Gupta - "Baisc Electronics & LinearCircuits" - Tata Mcgraw-Hill.
2. Malvino, A. P. - "Electrinics Principles" - Tata Mcgraw-Hill.
3. Sedra, Adel S. Smith, Kenneth. C. " Micro ElectronicsCircuits" - Oxford University Press 5th Edtion

[DEC-43P] ELECTRONIC DEVICES AND CIRCUITS LAB

List of Experiment

1. To measure the overall gain of two stage R.C. coupledamplifier at 1 Khz and note the effect of loading of second stage on the first stage.
2. To plot the frequency response of R-C soupled amplifier.
3. (a) To plot the load Vs output power characteristics todetermine the maximum signal input for undistortedsignal output.

(b) The above experiment is to be performed with singleended power amplifier; Transistorized push; pullamplifier; Compl-ementary Symmetry power Amplifier.

4. To observe the effect of a by-pass capacitor by measuringvoltage gain and plotting of frequency response for a singlestage amplifier.
5. To measure input and output impedance of a feedbackamplifier with and without by-pass capacitor.
6. Measurement of voltage gain input and output impedance andplotting of frequency response of an emitter follower circuit.
7. Measurement of resonant frequency, plotting of the responsecurve (i.e. graph between input frequency and impedance)and calculation of Q with the help of this curve for seriesand parallel resonant circuit.

8. To measure the frequency response of a single stage tunedvoltage amplifier and calculation of the Q of the tuned circuit load.
9. Observe and plot the output waveshapes of ;
(a) R-C differentiating circuits.
(b) R-C integrating circuits for square wave input (observethe effect of R-C time constant of the circuits on the output waveshape for both the circuits).
10. (a) Observe the output waveforms of given biased andunbiased series and shunt clipping circuits, forpositive and negative peak clipping circuits, forpositive and negative peak clipping of a sine waveusing switching diodes and D-C sources and compare itwith input wave.
(b) Observe the output wave shape of given double clippercircuit using diodes and D-C sources.
(c) Observe the output wave shape of given zener diode andtransistor clipper circuits for positive peak, negative peak and double clipping sine (or other) waveshapes.
11. To clamp square wave to their positive and negative peaksand to a specified level.
12. To measure Ic and Vce for transistor when Ib is varied fromzero to maximum value and measure the valur of Vce and Icfor saturation at a given supply, voltage and load.
13. To test a transistor schmitt trigger circuit, observe andplot the waveshapes at various points.
14. Use of Op-Amp. (for IC-741) as Inverting and non-invertingamplifier, adder, comparator, buffer, scale changer.
15. Simple working circuits using NE555.
16. To determine the range of frequency variation of a RC phaseshift oscillator.
17. To test adjustable IC regulator and current regulator.
18. Identification, Pin configuration and basic working ofdifferent popular IC's - Exm.- Power amplifier, Oscillator, Tuned amplifier, Multivibrator, Timer.

[DEC-44] PRINCIPLES OF COMMUNICATION ENGINEERING

1. INTRODUCTION
1.1 Brief idea of various types of communication system.
1.2 Need of modulation and demodulation in communication system.
1.3 Types of modulation-Brief description and typicalapplication of AM, FM, phase modulation and pulse modulation(PAM, PPM and PCM).
2. AMPLITUDE MODULATION
2.1 Derivation of expression for an amplitude modulated wave.Carrier and side bands, modulation index and depth of modulation.
2.2 Relative power distribution in carrier and side bands.
2.3 Elementary idea of DSB, DSB-SC, SSB, SSB-SC modulation andtheir comparison.
2.4 Vestigial side band modulation and its application.
3. FREQUENCY MODULATION
3.1 Derivation of an expression for frequency modulated wave andits frequency spectrum Modulation index, Maximum frequency deviation anddeviation ratio.
3.2 Advantages and disadvantages of FM over AM in communicationsystems based on consideration of band width requirement andnoise.
4. PHASE MODULATION
Expression of phase modulated wave and its comparison with frequency modulation. (Brief introduction only)
5. PULSE CODE MODULATION
5.1 Elementry idea of sampling theory and pulse modulation;Shanon'stheorm and coding technique, Quantization (Briefidea only).
5.2 Time Division and frequency division multiplexing, CDMA,WDMA, FDMA and TDMA (Brief Idea Only).
5.3 PCM system, Types of PCM and its application.
5.4 Digital Modulation Techniques (ASK, FSK, PSK, DPSK) (BriefIdea Only).

6. PRINCIPLE OF AM MODULATORS

6.1 Working principles and typical application of

- Collector Modulator.
- Base Modulator.
- Balanced Modulator.

6.2 Single-Side-Band (SSB) generation and its typicalapplications.

7. PRINCIPLE OF FM MODULATORS

7.1 Working principle and applications of reactance tubemodulator, varactor diode modulator and armstrong phase modulator.

7.2 Limiter, pre-emphasis and de-emphasis in FM communicationsystem.

8. DEMODULATION OF AM WAVES

8.1 Principle of demodulation of AM wave using diode detectorcircuit; concept of diagonal clipping and formula for RCtime constant for minimum distortion (No derivation).

8.2 Comparison of typical diode detector circuits in a Radio andTV receiver.

9. DEMODULATION OF FM WAVES

9.1 Basic principles of detection of FM waves.

9.2 Foster-seelydiscriminator and its working principles.

9.3 Working of Ratio-detector circuit and its advantage overFoster-seely discriminator circuits.

9.4 Basic principle of Quadrature detection.

10. TRANSMITTERS

10.1 Classification of transmitters on the basis of power,frequency and modulation.

10.2 Block diagram of an AM transmitters and working of eachstage. Low level and High level modulation.

10.3 Block diagram and working principle of reactance tube and
Armstrong FM transmitters.

11. RADIO RECEIVER

11.1 Brief description of crystal and TRF radio receivers; Need
for and principles of superheterodyne radio receiver.

11.2 Block diagram of super-heterodyne AM receiver, function ofeach block and typical waveforms at the input and output ofeach block.

11.3 Block diagram of an FM receiver, function of each block andwave/forms at input and output at different blocks.

12. ANTENNA AND PROPAGATION

12.1 Physical concept of radiation of electromagnetic energy froman antenna, relationship between the direction of electricand magnetic fields with direction of propagation; conceptof polarisation of EM waves.

12.2 Electromagnetic spectrum and its various range VLF, LF, HF,VHF, UHF, Micro wave, Optical waves etc.

12.3 Definition and physical concepts of the terms used withantennas like point source, gain, power gain, directivity aperture, effective area, radiation pattern, (fieldstrength, power and phase) beam angle, beam width andradiation resistance.

12.4 Types of antennas-Brief description, characteristics andtypical applications of medium wave antenna, shortwave antenna, HF antenna, VHF, UHF and Microwave antenna e.g.,half wave dipole, ground plane, yagi and ferrit rod antennain transistor receiver.Brief idea about Rhombic antenna,dish antenna, Horn, Parabolic reflector and Lens antenna.

12.5 Antenna arrays-Brief description of broad side and end firearrays, their radiation pattern and application (withoutanalysis);

12.6 Basic idea about different modes of radio wave propagationgroundwave propagation, space wave propagation and sky wavepropagation, their characteristics and typical areas ofapplication. (e.g. medium wave, short wave,TV communication.)

12.7 Explanation of the terms-critical frequency, maximum usablefrequency (MUF) and skip distance.

13. Communication Media:- Telephone Lines, Twisted Pair Wire,Co-axial Cable, Fibre optics.

14. Modems - Basic working principle of modems and theirapplication

15. Multiplexers- Dightal Multiplexers- Synchronous andAsynchronous(Brief Idea Only).

List of Books

1. Simon Haykin-Communication System- John Wiley & Sons.
2. Kennedy & Davis- Electronic Communication System – TataMcgraw Hill.
3. Sombir Singh - Principle of Communication Engineering – JaiPrakesh Publication, Meerut

[DEC-44P] PRINCIPLE OF COMMUNICATION ENGINEERING LAB

List Of Experiments

1. (a) To observe an AM wave on CRO produced by a standardsignal generator using internal and externalmodulation.
(b) To measure the modulation index of the wave obtained inabove experiment.
2. (a) To obtain an AM wave from a collector modulator circuitand observe the Am pattern on CRO.
(b) To measure index of modulation of the AM signal fordifferent level of modulation signal.
3. To obtain a FM wave from reactance tube modulator/voltagecontrolled oscillator (using 8038 of 566) circuit and measure the frequency deviation for different modulatingsignal.
4. To obtain modulating signal from an AM detector circuit andobserve the pattern for different RC time constants andobtain its optimum value for least distortion.
5. To obtain modulating signal from a FM detector (Fosterseely/Ratio detector/quadrature detector) Circuit (or using 2211 or PLL 565) and plot the detector characteristics.
6. To obtain AM-SB from Balanced modulator.(BM025 may beused).
7. To detect AM-SB by using SSB detector. (SL 640C may beused).
8. To identifying different stages of radio receiver and ICused at each stage and plot the sensitivity characteristics of a radio receiver and determination of the frequency formaximum sensitivity.
9. To plot the selectivity characteristics of a radio receiver.
10. To plot the fidelity characteristics of a radio receiver.
11. (a) To plot the radiation pattern of directional andomnidirectional antenna.
(b) To plot the variation of field strength of radiated
wave, with distance from a transmitting antenna.
12. Tuning and alignment of radio receiver.
13. Circuit tracing and fault finding of different stages ofradio receiver.
14. Simple demonstration, ASK, FSK and PSK through training kits

NOTE :- Antenna simulator developed by TTTI can be used forthis experiment.

[DEC-45]PRINCIPLE OF DIGITAL ELECTRONICS

1. INTRODUCTION TO DIGITAL ELECTRONICS:
1.1 Basic difference between analog and digital signal.
1.2 Application and advantages of digital signal processing.
2. NUMBER SYSTEM:
2.1 Binary, Octal and Hexadecimal number system; conversion fromdecimal octal and hexadecimal to binary and vice-versa.
2.2 Binary addition, substraction, multiplication and divisionincluding binary points.
2.3 1's and 2's complements methodsubstraction.
3. CODES, CODE CONVERSION AND PARITY:
3.1 The 8421 and excess-3 codes; mention of other populer BCDcodes.
3.2 Addition of 8421, BCD coded numbers its limitations and excess-3 coded numbers.
3.3 Gray code, Gray to binary conversion and vice-versa.
3.4 Basic concept of parity, single and double parity and errordetection.
4. LOGIC GATES:
4.1 Definition, symbols and truth tables of NOT, AND, OR, NAND,NOR, EXOR Gates.
4.2 Concept of negative and positive logic.
5. LOGIC SIMPLIFICATIONS
5.1 Boolean algebra, Karnaugh-mapping (upto 4 varibles) andsimple application in developing combinational logic

circuits.
5.2 Implementation of logic equations with gates.
5.3 Use of NAND and NOR gates as universal gates.
6. LOGIC FAMILIES AND DIGITAL ICS:
6.1 Logic family classification :
(a) Definition of SSI, MSI, LSI, VLSI.
(b) Bipolar Logic, Diode Logic, Transistor Logic Inverter,TTL logic, MOS,CMOS logic, logic ECL
(c) Sub-classification of TTL and MOS logic families.
(d) Characteristics of TTL and MOS Digital gates delay,speed of noise margin, logic levels, power dissipation,FAN-IN, FAN-OUT, power supply requirements andcomparison between TTL and MOS ICs.
6.2 Logic Circuits :
(a) Open collector and to tempole output circuit operationfor a standard TTL, NAND gate.
(b) MOS circuit operation for a standard gate (NOR).
6.3 Tristate Switch : Normally open and normally closed switch.
6.4 Familiarisation with commerical digital IC gates, Theirnumber identification and Pin configuration.
7. ARITHMETIC OPERATIONS:
7.1 Design of Exclusive or, Half adder and Half subtractor.
7.2 Design of Full adder circuits and its operation.
7.3 Design of Full subtractor circuits and its operation.
7.4 Some examples (circuits) of code convertors.
8. ENCODER, DECODERS & DISPLAY DEVICES ASSOCIATED CIRCUITS:
8.1 LED, LCD, seven segment display, basic operation of variouscommonly used types.
8.2 Four Decoder circuits for 7 segment display.
8.3 Basic decimal to BCD encoder circuits.
8.4 Use of decoders/driver ICs with reference to commercial ICs.
8.5 Basic Multiplexer and De-multiplexer
9. FLIP FLOPS:
9.1 Operation using waveforms and truth tables of following flipflops.RS, T, RST, D, JK, Master/Slave JK Flip Flops mention ofcommonly used ICs Flip flops.
10. COUNTERS:
10.1 Counters classification.
10.2 Binary and decade counters.
10.3 Divide by N counters.
10.4 Programmable asynchronous counters.
10.5 Down counters up/down counter operations.
10.6 Presettable asynchronous counters.
10.7 Difference between asynchronous and synchronous counters.
10.8 Ring counters with timing diagram.
10.9 Familiarization with commercial TTL/CMOS counters ICs.
11. SHIFT REGISTERS:
11.1 Introduction and Basic concepts including shift left and shift right.
11.2 Serial in serial out Serial in parallel out.Parallel in serial out.Parallel in parallel out.
11.3 Universal shift register.
11.4 Familiarisation with common TTL/CMOS ICs.
11.5 Buffer register, Tristate Buffer Register.
12. MEMORIES:
12.1 Classification according to the following heads.
(a) Volatile and non-volatile memories.
(b) Random access memories and sequential access.
(c) Semiconductor and non-semiconductor memories.
(d) Destructive and non-destructive memories.

12.2 Semi-conductor ROMs, PROMs, EPROM, SRAM, DRAM, Basic structure and working of CCD, R/W memory.
13. A/D AND D/A CONVERTORS:
13.1 Use of A/D and D/A converters.
13.2 Binary resister network R-2R network.
13.3 D/A converter using R-2R.
13.4 UP, UP/Down counter type A/D converter.
13.5 Successive approximation.
13.6 Basic concepts of parallel A/D converter.
13.7 Two bit A/D converter.
14. ARITHMETIC CIRCUITS: Ideas About
14.1 Basic Arithmetic logic units applications.
14.2 Block diagram explanation of binary multiplier circuit.
List of Books
1. Malvino& Leach- Digital Principles & Application-Mcgraw Hill- 5th Edition.
2. Mano, M. Morris- Digital Logic and Computer Design- PrenticHall (India)

[DEC-45P]PRINCIPLE OF DIGITAL ELECTRONICS-LAB

List of Experiments
1. Do atleast 20 experiments familiarzation with bread-board.FamiliarzationWith TTL And MOS ICs.
2. Identification of Ic-nos, Pin-nos, Ic types.
3. To observe that logic low and logic high do not have samevoltage value in input and output of logic gate.
4. To observe the propagation delay of TTL logic gate.
5. Observation of the difference between MOS and TTL gatesunder the following heads
(a) Logic levels.
(b) Operating voltages.
(c) Propagation delay.
Display Devices And Associated Circuits.
6. Familiarisation and use different types of LEDs commonanode and common cathode seven segment display.
7. Use of 7447 BCD to 7-segment decoder.
8. Verification of truth table for 2 Input NOT, AND, OR, NAND,NOR, XOR Gates.Design And Implementation Of Simple Logic Circuits.
9. To construct a 4-bit even/odd parity generator/checker usingXOR gates and to verify their truth tables.
10. To construct half adder and half subtractor using XOR andNAND gates verification of their truth tables.
11. To construct a full adder circuit with XOR and NAND gates.
12. (a) Study of 3 bit adder circuit implemented with or and NAND gates.
(b) To construct 4 bit adder and full subtractor using fulladder chip 7480 and NAND gates.
13. (a) To verify the truth table of 4 bit adder IC chip 7483.
(b) To construct the 4 bit adder/2's complement subtractorusing 7483 and NAND gates.
Flip Flops.
14. To verify the truth table for selected positive edgetriggered and negative edge triggered F/F of J-K and D type.
Counters
15. To construct and verify truth table for asynchronous binaryand decade

THIRD YEAR

SEMESTER-V

INDUSTRIAL MANAGEMENT AND ENTREPRENEURSHIP DEVELOPMENT

DETAILED CONTENTS

1. PRINCIPLES OF MANAGEMENT :

Definition of management, Administration organisation, Functions management, Planning, Organizing, Co-ordination and control, Structure and function of industrial organisations, Leadership- Need for ledership, Factors to be considered for accomplishing effective leadership, Communication -Importance, Processes, Barriers to communication, Making communication, Effective, formal and informal communication, Motivation - Factors determining motivation, Positive and negative motivation, Methods for imporving motivation, Incentives, Pay promotion and rewards, Controlling - Just in time, Total quality management, Quality circle, Zero defect concept. Concept of Stress Management

2. HUMAN RESOURCE DEVELOPMENT :

Introduction, Staff development and career development, Training strategies and methods.

3. HUMAN AND INDUSTRIAL RELATIONS :

Human relations and performance in organisation, Understand self and others for effective behaviour, Industrial relatios and disputes, Charcteristics of group behaviour and Trade unionism, Mob psychology, Labour welfare, Workers participation in management.

4. PERSONNEL MANAGEMENT :

Responsibilities of human resource management - Policies and functions, Selection - Mode of selection - Procedure - training of workers, Job evalution and Merit rating - Objectives and importance wage and salary administration - Classification of wage, Payment schemes, Components of wage, Wage fixation.

5. FINANCIAL MANAGEMENT :

Fixed and working capital - resource of capital, Shares, types preference and equity shares, Debentureptypes, Public deposits, Factory costing, Direct cost, Indirect cost, Factory over head, Fixation of selling price of product, Depreciation- Causes, Methods.

6. MATERIAL MANAGEMENT :

Objective of a good stock control system - ABC analysis of inventory, Procurement and conumption cycle, Reorder level, Lead time, Economic order quantity, Pruchasing procedure, Stock keeping, Bin card.

7. LABOUR, INDUSTRIAL AND TAX LAWS :

Importance and necessity of industrial legistation, Types of labour laws and dispute, Factory Act 1948, Payment of Wages Act 1947, Employee State Insurance Act 1948, Various types of taxes - Production Tax, Local Tax, Trade tax, Excise duty, Imcome Tax.

8. ENTREPRENEURSHIP DEVELOPMENT :

Concept of entrepreneurship, need of entrepreneurship in context of prevailing employment conditions of the country. Sucessful entrepreneurship and training for entrepreneurship development. Idea of project report preparation.

9. INTELLECTUAL PROPERTY RIGHTS :

Introduction to IPR (Patents, Copy Right, Trade Mark), Protection of undisclosed information, Concept and history of patents, Indian and International Patents Acts and Rules, Patentable and Nonpatentable invention including product versus Process.

ELECTRONIC INSTRUMENTS AND MEASUREMENTS

DETAILED CONTENTS

1. INTRODUCTION TO THE PROCESS OF MEASUREMENTS:

1.1 Review of the terms, accuracy, precision, sensitivity range and errors, difference between accuracy, precision and resolution.

1.2 Precaution against high frequency noise pick up and remedies, shielding and grounding (two terminal and three terminals).

1.3 Concept of selective wide band measurements.

2. MULTIMETERS:

2.1 Principle of measurement of D.C. voltage and D.C. current, A.C. voltage and A.C. current and resistance in a

multimeter.
2.2 Specifications of a multimeter and their significance.
2.3 Limitations with regards to frequency and impedance.
3. ELECTRONIC MULTIMETER:
3.1 Advantage over conventional multimeter for voltage measurement with respect to input impedance and sensitivity, principles of voltage, current and resistance measurements.
3.2 Specification of electronic multimeter and their significance.
4. A. C. MILLIVOLTMETER:
4.1 Types of AC millivoltmeters: Amplifier-rectifier and rectifier amplifier, block diagram and explanation of the above types of A.C. milli voltmeter.
4.2 Typical specifications and their significance.
5. CATHODE RAY OSCILLOSCOPE:
5.1 Construction of CRT, Electron gun, Electrostatic focusing and acceleration (Explanation only-no mathematical treatment) Deflection sensitivity, Brief mention of screen phospher for CRT. Internal Block Diagram of CRO.
5.2 Explanation of time base operation and need for blanking during flyback, synchronisation.
5.3 Block diagram and explanation of a basic CRO and a triggered sweep oscilloscope, front panel controls.
5.4 Specifications of CRO and their significance.
5.5 Use of CRO for the measurement of voltage (D.C. & A.C.) frequency using Lissagious figure, time period, phase.
5.6 Special features of dual trace, delayed sweep and storage CROs (Brief mention only).
5.7 CRO probes including current probes.
5.8 Working Principle of Spectrum Analyzer.
6. AUDIO POWER METER:
6.1 Block diagram of an audio power meter.
6.2 Principles of working its application and high frequency limitations.
6.3 Scale conversion from power to db.
7. SIGNAL GENERATORS:
7.1 Block diagram explanation of laboratory type low frequency and RF signal generators, pulse generator and function generator.
7.2 Specification for low frequency signal generator, RF generator, pulse generator and function generator. Brief idea of testing specification for the above instrumets.
7.3 Standard signal generator.
8. IMPEDANCE BRIDGES Q METERS:
8.1 D.C. and A.C. Bridges :
D.C. bridges- Wheat stone bridge, Kelvins bridges, Senstivity- Null indicators. A. C. Bridges - Inductance bridges (Maxwell bridge), Capacitance bridges, Hays bridge, Anderson bridge, Schering bridge, Wein bridge, Twin betwork, Storage factor, Dissipation factor and their measurments.
8.2 Block diagram explanation and working principle of laboratory types (balancing type) RLC bridge. Specifications of a RLC bridge, Principle of digital RLC bridge.
8.2 Block diagram and working principles of a Q meter.
9. REGULATED POWER SUPPLY:
9.1 Block diagram of regulated power supply, IC based power supply.
9.2 Major specifications of regulated power supply, and their measurement (line and load regulation, output ripple and transients).
9.3 Basic working principles of switched mode power supply.
9.4 Concept of floating and grounded power supplies and their interconnections to obtain multiple output supplies.
9.5 Basic working principle of uninterrupted power supply
10. DIGITAL INSTRUMENTS:
10.1 Comparison of Analog and Digital instruments, characteristics of digital meter.
10.2 Working principle of Ramp, Dual slope and integrating type of digital voltmeter.
10.3 Block diagram and working of a digital millimeter.
10.4 Working principle of time interval frequency and period measurement using universal counter, frequency counter, time base stability and accuracy and resolution.

ELECTRONIC INSTRUMENTS AND MEASUREMENT LAB

List Of Practicals
1. Loading effect of a multimeter and its limitations to measure high frequency voltages.
2. Measurement of Q of a coil and its dependence on frequency using a Q meter.

3. Measurement of voltage, frequency, time period, phase angle and delay time using CRO : (use of Lissagious Figures).
4. Measurement of time period, frequency, average period using universal counter frequency counter.
5. To test a power supply for ripple, line and load regulation, Tracing of wave form, To findout operating range of power supply.
6. Measurement of rise, fall and delay time using a CRO.
7. Measurement of distortion of a LF signal generator using distortion factor meter.
8. Measurement of R.L. and C using a LRC bridge/universal bridge.

AUDIO AND VIDEO ENGINEERING

DETAILED CONTENTS

1. ELECTRO ACOUSTIC TRANSDUCERS:

1.1 Microphones-carbon, condensor, moving coil, crystal, ribbon and lavaliere microphones, their construction and basic working principles, frequency response, impedance, sensitivity and directional patterns, typical applications of different types of microphones. Idea of other commercial microphones.

1.2 Loudspeakers-direct radiating and horn loader type their construction, working principles characteristics and applications. Baffles and Enclosures. Introduction to tweeters and woofers and crossover networks, Speakers column.

2. SOUND RECORDING:

Magnatic Recording :

2.1 Basic Idea about Sound Recording on Magnetic Tape and its reproduction.

2.2 Optical Recording of Sound :

Basic ideas of optical recording of sound on films and its reproduction

2.3 Digital Recording of Sound :

Basic ideas of Digital Recording and Reproduction of Sound. Basic concepts of sampling quantization, aliasingand encoding. formats of digital audio recording, basic of recording-Servo system. Material and formation of CD, Black diagram of audio CD player. Description of its main block.

3. HI-FI STEREO AND ITS SYSTEM:

3.1 General ideas about public address system and its block diagram.

3.2 Concept of Fidelity, noise and different types of distortions in an audio system. Stereophony, comparison of monophonic and stereophonic sound. Brief description of stereophonic recording on tape. Block diagram of hi-fi stereo system, Function of bass, Treble, Loudness and Balance control. Consequences of mismatach between amplifier output and speaker impedance. Need for a multi-speaker column. Cross over network in speaker columns.

4. VCD :

4.1 Basic principles of video recording and reproduction on discs by LASER technology.

4.2 Encoding of video signal, video format, Encoding of audio data for VCD.

4.3 Block diagram of VCD player and description of main block.

5. DVD :

5.1 Basic principles of video recording and reproduction on discs by Digital technology, Blue ray technology of recording

5.2 Basic concept of sampling and encoding,DVD Video format, DVD audio format.

5.3 Block diagram of DVD player and description of main component. Comparison of VCD and DVD.

6.A. INTRODUCTION TO TV COMMUNICATION:

6.1 Elements of telecast TV chain giving elementary idea of the role of TV camera, TV transmitter, propagation of signal, reception through antennas, TV receiver.

6.2 Brief mention of other types of TV communication such as CCTV, CATV, MATV, Sattelite TV and their applications.

6.3 Brief mention of factors affecting range of TV coverage such as:-

(a) Line of sight propagation.

(b) Effect of earth's curvature.

(c) Receiving and transmitting antenna heights.

(d) Power of transmitter.

6.B. PRINCIPLES OF SCANNING AND FORMATION OF COMPOSITE VIDEO SIGNALS:

6.1 Basic of photoelectric conversion from scene to electrical signal through camera tube.

6.2 Sequential and interlaced scanning, line frequency field frequency.

6.3 Concept of :-

(a) Field and Frame.

(b) Persistance of vision and flicker.
(c) Horizontal and vertical resolution.
(d) Picture element.
(e) Relationship between interlacing and bandwidth.
(f) Aspects ratio.
(g) Relationship between line frequency, field frequency and video bandwidth.
6.4 Specifications of CCIR standard composite signal used in India, incluing the need of synchronisation blanking, and equalizing pulses signals (line and field) complete explanation of need for front and back porch in the VHF.
6.5 Frequency range of various bands and channels in the VHF range used in India.
6.6 Channel specifications :
6.6.1 Channel frequency limits, vision and sound carrier frequencies.
6.6.2 Need for VSB and VSB specifications.
6.6.3 Vision bandwidth, vision modulation types, sound bandwidth, sound modulation type, reasons for employing AM for vision FM for sound and negative modulation for TV transmission, Composite Video Signal.
7. CAMERA TUBES:
7.1 Brief description about vidicon and plumbicon camera tubes.
7.2 Basic concepts of Signal tube colour camera, its construction and working
8. TV TRANSMITTER AND RECEIVER:
8.1 Construction, Working and installation of Yagi Antenna
8.2 Block diagram of B/W TV transmetter and function of each block.
8.3 Block diagram of B/W TV receiver and function of each block.
8.4 Function of different control of a B/W TV receiver.
9. PICTURE TUBE:
9.1 Basic principle of operation and working B and W picture
tube, its mounting and adjustment of Yoke.
9.2 Brief idea about delta gun and guns in line picture tube.
9.3 Construction and working of single gun(Trinitron) picture tube
9.4 Brief idea about shadow mask, convergence, degosing and purity.
10. FUNDAMENTAL OF COLOUR SIGNAL:
10.1 Basic idea about primary and complementry colour (Why, Red, Blue and Green are used as primary colour).
10.2 Need for compatibaity with Black and White and Colour system.
10.3 Production of Luminuance and colour difference signal.
11. COLOUR CAMERA :
11.1 Digital colour camera system.
11.2 Solid state imagers.
12. NTSC & PAL FUNDAMENTALS:
12.1 Basic principles of NTSC & PAL system.
12.2 Basic principle of QAM (Qudratur Amplitude Modulation)
12.3 Basic principle of PAL-S, PAL-D and Synchronous demodulation
12.4 Block diagram of NTSC and PAL coder and decoder, function of each block
13. VIDEO DISPLAY UNITS (VDU):
13.1 Block diagram and specifications of colour VDU and function of each block.
13.2 Interfacing of VDU with computers.
13.3 Basic idea about LCD/Plasma/LED monitor
13.4 Remote controlling of Electronic Devices (Basic Idea).
13.5 Basic Idea about 3DTV.

AUDIO AND VIDEO ENGINEERING LAB

List Of Practicals
1. Study of different features and Measurement of directivity of various types of microphones and loudspeakers. (Approximate).
2. Frequency response of crossover networks in speaker columns.
3. Installation and operations of PA system. (Preferably in auditorium).
4. Familiarity with the working of audio CD player and identification of main stages and components.
5. To study the operation and control of DVD player and identification of main stages and components.
6. Familiarisation with the physical layout, location of stages (transistors, ICs), major components, measurement of D.C. voltage & tracing of signal in B & W TV receiver. The student should be required to identify components from circuit diagram with physical layout of corresponding parts, marks hazardous areas.

7. Familiarisation with all controls and efects of adjustments of controls on the performance of a B & W TV receiver.
8. Testing of B & W CRT and associated circuits for defective operation, familarity with pin connections, typical operating voltages and currents, typical circuit resistances of deflection coils.
9. Familiarisation with the physical layout, location of stages (transistors, ICs), major components, measurement of D.C. voltage & tracing of signal in Colour TV receiver. The student should be required to identify components from circuit diagram with physical layout of corresponding parts and marks hazardous areas.
10. Familiarisation with all controls and efects of adjustments of controls on the performance of a Colour TV receiver.
11. Installation of a TV receiver antenna and measurement of its impedance.
12. Fault finding in each stage of a B/W receiver.
13. Fault finding in each stage of a TV receiver.

MICROPROCESSORS AND APPLICATIONS

DETAILED CONTENTS

1. OVERVIEW OF MICROCOMPUTERS SYSTEM:
1.1 Functional block.
(a) CPU.
(b) Memory.
(c) Input/Out devices (Key board, Floppy drive, Harddisk drive, Tape drive, VDU, Printer, Plotter).
1.2 Concept of programme and data memory.
(a) Registors (general purpose).
(b) external memory for storing data and results.
1.3 Data transfer between registers.
1.4 Concept of tristate bus.
1.5 Control on registers.
2. MEMORY OF A MICROCOMPUTER:
2.1 Concept of byte organised memory.
(a) Address inputs.
(b) Address space.
(c) Data input/output.
2.2 Addressing and Address decoding.
(a) Memory system organisation.
(b) Partitioning of total memory space into small blocks.
(c) Bus contention and how to avoid it.
2.3 Memory chips.
(a) Types of ROM, RAM, EPROM, PROM.
(b) Read/Write inputs.
(c) Chip enable/select input.
(d) Other control input/output signals.
- Address latching.
- Read output.
- Address strobes.
(f) Power supply inputs.
2.4 Extension of memory.
- In terms of word length and depth.
3. C P U & CONTROL:
3.1 General microprocessor architecture.
3.1 Instruction pointer and instruction register.
3.2 Instruction format.
- Machine and Mnimonics codes.
- Machine and Assembly language.
3.3 Instruction decoder and control action.
3.4 Use of Arthematic Logic Unit.
- Accumulator.
- Temporary Register.
- Flag flip-flop to indicate overflow, underflow, zero result occurance.
3.5 Timing and control circuit.
- Crystal and frequency range for CPU operation.
- Control bus to control peripherals.

4. INTRODUCTION OF 8085 MICROPROCESSOR:
Evolution of Microprocessor, Register Structure, ALU, BUS Organization, Timing and Control.
5. INTRODUCTION OF 8086 MICROPROCESSOR:
Internal organization of 8086, Bus Interface Unit, Execuation Unit, Unit, register, Organization, Sequential Memory Organization, Bus Cycle.
6. ASSEMBLY LANGUAGE PROGRAMMING :
Addressing Modes, Data Transfer, Instructions, Arithmetic and Logic Instruction, Program Control Instructions (Jumps, Conditional Jumps, Subroutine Call) Loop and String Instructions, Assembler Directives.
7. BASIC I/O INTERFACING :
Programmed I/O, Interrupt Driven I/O, DMA, Parallel I/O (8255-PPI, Centronics Parallel Port), Serial I/O (8251/8250, RS-232 Standard), 8259-Programmable Interrupt Controller, 8237-DMA Controller, 8253/8254-Programmable Timer/Counter, A/D and D/A conversion.
8. MEMORY INTERFACING :
Types of Memory, RAM and ROM Interfacing with Timing Considerations, DRAM Interfacing.
9. ADVANCE MICROPROCESSOR AND MICRO CONTROLLERS :
Brief idea of Microcontroller 8051, Pentium and Power PC

MICROPROCESSORS AND APPLICATIONS LAB

List Of Practicals
1. Assembly language programming :- Programming of simple problems.
2. Simple programming problems using 8085 and 8086 microprocessor.
Trainer kit to gain competence in the use of
(a) 8085 and 8086 Instruction set.
(b) Support chips of 8085 and 8086.

FIELD EXPOSURE

SEMESTER-VI

ENVIRONMENTAL EDUCATION & DISASTER MANAGEMENT

1. INTRODUCTION :
- Basics of ecology, Ecosystem, Biodiversity Human activities and its effect on ecology and eco system, different development i.e. irrigration, urbanization, road development and other engineering activities and their effects on ecology and eco system, Mining and deforestation and their effects.
- Lowering of water level , Urbanization.
- Biodegradation and Biodegradibility, composting, bio remediation, Microbes .Use of biopesticidies and biofungicides.
- Global warning concerns, Ozone layer depletion, Green house effect, Acid rain,etc.
2. POLLUTION :
Sources of pollution, natural and man made, their effects on living environments and related legislation.
2.1 WATER POLLUTION :
- Factors contributing water pollution and their effect.
- Domestic waste water and industrial waste water. Heavy metals, microbes and leaching metal.
- Physical, Chemical and Biological Characteristics of waste water.
- Indian Standards for qulity of drinking water.
- Indian Standards for quality of treated waste water.
- Treatment methods of effluent (domestic waste water and industrial/ mining waste water), its reuse/safe disposal.
2.2 AIR POLLUTION :
Definition of Air pollution, types of air pollutants i.e. SPM, NOX, SOX, GO, CO2, NH3, F, CL, causes and its effects on the environment.
- Monitoring and control of air pollutants, Control measures techniques. Introductory Idea of control equipment in industries i.e.
A. Settling chambers
B. Cyclones
C. Scrubbers (Dry and Wet)

D. Multi Clones
E. Electro Static Precipitations
F. Bog Fillers.
- Ambient air qulaity measurement and their standards.
- Process and domestic emission control
- Vehicular Pollution and Its control with special emphasis of Euro-I, Euro-II, Euro-III and Euro IV.
2.3 NOISE POLLUTION :
Sources of noise pollution, its effect and control.
2.4 RADISACTIVE POLLUTION :
Sources and its effect on human, animal, plant and material, means to control and preventive measures.
2.5 SOLID WASTE MANAGEMENT :
Municipal solid waste, Biomedical waste, Industrial and Hazardous waste, Plastic waste and its management.
3. LEGISLATION :
Preliminary knowledge of the following Acts and rules made thereunder-
- The Water (Prevention and Control of Pollution) Act - 1974.
- The Air (Prevention and Control of Pollution) Act - 1981.
- The Environmental Protection (Prevention and Control of Pollution) Act -1986. Rules notified under EP Act - 1986 Viz.
The Manufacture, Storage and Import of Hazardous Chemical (Amendment) Rules, 2000
The Hazardous Wastes (Management and Handling) Amendment Rules, 2003.
Bio-Medical Waste (Management and Handling) (Amendment) Rules, 2003.
The Noise Pollution (Regulation and Control) (Amendment) Rules, 2002.
Municipal Solid Wastes (Management and Handling) Rules, 2000.
The Recycled Plastics Manufacture and Usage (Amendment) rules, 2003.
4. ENVIRONMENTAL IMPACT ASSESSMENT (EIA) :
- Basic concepts, objective and methodology of EIA.
- Objectives and requirement of Environmental Management System (ISO-14000) (An Introduction).
5. DISASTER MANAGEMENT :
Definition of disaster - Natural and Manmade, Type of disaster management, How disaster forms, Destructive power, Causes and Hazards, Case study of Tsunami Disaster, National policy- Its objective and main features, National Environment Policy, Need for central intervention, State Disaster Authority- Duties and powers, Case studies of various Disaster in the country, Meaning and benefit of vulnerability reduction, Factor promoting vulnerability reduction and mitigation, Emergency support function plan. Main feature and function of National Disaster Management Frame Work, Disaster mitigation and prevention, Legal Policy Frame Work, Early warning system, Human Resource Development and Function, Information dissemination and communication.

MODERN COMMUNICATION SYSTEMS

DETAILED CONTENTS
1. INTRODUCTION TO COMMUNICATION SYSTEM :
Basic idea of telegraphy, telephonic, digital, microwave, fibre optics, sttellite, mobile and data communication.
2. TELEGRAPHY AND TELEPHONY:
A. Facsimile transmission- Elementary idea of Fax machine and its operation, Transmission and Receiving process
B. Telephone component- Construction and working of transmitter and receiver components, parts, curcuit and working of subscriber's push button telephone sets.
C. Brief idea of Automatic Exchanges
D. Brief Idea of Electronic Exchanges and PCO.
3. DIGITAL SWITCHING SYSTEM :
Salient feature, architecture and services of C-DOT 128, C DOT 256, C-DOT 512, EWSD (Electronic Digital Switching Network, OCB-283.
4. OPTICAL COMMUNICATION:
4.1 Introduction : Block diagram of optical fiber communication system, advantages of optical communication
4.2 Optical Fibre : Structure of optical wave guide, light propagation in optical fiber, Ray and wave theory, Modes in optical fiber, Step and Graded index fibers.
4.3 Transmission Characteristics of Optical Fibers : Signal degradation in optiecal fibers, Attenuation losses in optical fibers. Dispersion and pulse broadening in different types of fibers, Modal birefringence and polarisation maintaining fibers.

4.4 Principle laser action types of lasers, fabrication and characteristics of semiconductor lasers and L.E.D.'s
4.5 Requirements for Photo detectors, Types of photo detectors, Characteristics of photo detectors. Principle of APD and Pin diodes. Phot transistor and Photo Conductors.
4.6 Components of an optical fiber communication system, Digital and Analog Optical Communication System.
5. DIGITAL COMMUNICATION:
5.1 Elements of Digital Communication and information theory :
Model of a digital communication system, Logarithmic measure of information. Source coding fixed in and variable length code words. Hartely-Shannon law for channel.
5.2 Sampling Theory and Pulse Modualtion : Sampling theorem, Signal reconstruction in time domain. Types of analog pulse modulation, Method of generation and detection of PWM, PNM and PPM.
5.3 Waveform Coding Technique : Quantization, Quantization noise, Encoding and Pulse code modulation, Differential pulse code modulation, Delta modulation, Comparison of PCM and DM. 5.4 Digital Multiplexing : Fundamentals of time division multiplwxing electronic commutator.
5.5 Digital Modulation Techniques : Types of digital modulation, Wave forms for amplitude, Frequency and phase shift keying, Method of generation and detection of coherent and noncoherent binary ASK,FSK & PSK, Differential phase shift, Quadrature modulation techniques. (QPSK and MSK) Probability of error and comparision of various digital modulation techniques.
5.6 Error Control Coading : Error free communication over a noisy channel, Hamming sphere, Hamming distance and Hamming bound, Relation between minimum distance and error detecting and correcting capability.
6. SATELLITE COMMUNICATION:
(i) Introduction, historical background and basic Concepts of satellite communication. Elements of satellite communication link.
(ii) Geostationary orbits, Orbit mechanisms and lauching of satellte
(iii)Satellite space craft- Satellite sub system, Tracking and Command, Communication subsystem, Transponders, Space Craft antena
(iv) Satellite Channel and Link Design : Degin of down links and uplinks
(v) Earth stations technology : Earth Station Design, Earth Station Tracking, Low noise amplifiers.
(vi) Multiple access techniques :Frequency Division Multiple Access (FDMA), FDM/FM/FMFDMA, Time division, Multiple Access, Frame Structure and Synchronization, Code division, Multiple Access, random Access.
(vii) Introduction to DTH system
7. MOBILE COMMUNICATION :
Evaluation of mobile communication, A simplified reference model for mobile communications. A brief introduction of frequency for radio transmission, signals, propagation, Multiplexing, Modulation, Spread spectrum, Cellular system. Medium Access Control : Introduction To MAC, Advance Mobile Phone. Introduction to GSM(Global System For Mobile Communication), GPRS, GPS, Enable Positioning System. System Architecture, Protocol Architecture, Physical Layer and MAC layer. Mobile Networks
8. DATA COMMUNICATION :
1. Data Transmission Basics : Review of digital data anlog modulation and digital formats. Data rates, Baud Rates, Channel capacity, Mediums for communication, Synchronous and asynchronous data communication.
2. ISO-OSI model and TCP/IP model of network, Protocols and services. Connection oriented and connectionless services, their interpretation at different layers. Quality of
services, Design issue for different layers. 3. Data Links Layer Design Issues : Services provided to network layer froming: Necessity and techniques. Error control feature and review of techniques.
4. IEEE 802 standards for computer networks.
5. Brief idea of network layer, transport layer.
6. Internet and ISDN services.

MODERN COMMUNICATION SYSTEMS LAB

List Of Practicals
1. Study of FAX machines and its working.
2. To study the parts of telephone hand set :
(a) Frequency response of telephone receiver.
(b) To observe the wave form of impulses by dialling a number.
3. Visit and study of Digital Switching System.
4. Visit and study of Satellite transmission system.
5. Demonstration of sampling, FSk and PSK by simple experiment.
6. Demonstration of optical fibre communication through simple kits.
7. Study of working of mobile phones and its services.

8. Study and use of ISDN and Internet services.
9. Testing and fault finding of mobile phone and its service.
10. Visit and study of celluler base station.
11. Study of DTH system

OPTICAL FIBRE ENGINEERING

DETAILED CONTENTS

1. FUNCAMENTAL OF OPTICS :

1. Nature of Light :

1.1 Electromagnetic nature of light.
1.2 Principle of reflection, refractions, polarization.
1.3 Basic principle of optical communicaiton.

2. Introduciton To Optical Fibre :

2.1 Classificaiton of fibre
2.2 Physical structure.
2.3 Electromagnecic mode theory for optical propagation -
Electromegnetic waves, Modes in planar guide, Modes in cylinderical fiber phase and group velocity.

2. OPTICAL DEVICE :

1. Optical Sources :

1.1 Direct and indirect band gap semiconductors.
1.2 Internal and external quantum efficiency.
1.3 Principle, characteritics and construction of LED.
1.4 Semiconductor Lasers - Laser action, PN junction laser,
Febry- Perot resonators.

2. Detectors :

2.1 Introduction
2.2 Photodiode- Material and types.
2.3 Avalanche Photo Diode (APD), PIN diode.
2.4 Temperature effect on avalanche gain, noice in APD.
2.5 Photo transistor, PIN-FET, Photo darlingtion.
2.6 Response time, BW, Noise equivalent power, responsivity.
2.7 Spectral response, dark current and quantum efficiency.

3. connectors, Splicers and Splitters :

3.1 Need of connectors.
3.2 Types cof connectors.
3.3 Single and multimode fiber connectors.
3.4 Need and splicing.
3.5 Types of splicing.
3.6 Different splicing techniques.
3.7 Splitters.

4. Couplers and Cable

4.1 Need and types of couplers.
4.2 Source of fiber couplers, Fiber to Fiber couplers, Fiber to
detector couplers.
4.3 Entrinsic and Extrinsic coupling loss.
4.4 Reasens and types - Under ground, Under sea and over head.
4.5 Elements of cable structure and its characteristics.
4.6 Cable installation and design consideration.
4.7 Cable jacketing, cable lying, Transport and handling.

3. OPTICAL MEASUREMENT :

3.1 Introduction.
3.2 Transmission loss measurements - Fiber attenuation, Fiber abserption loss measurement, Fiber scattering loss measurement.
3.3 Fiber despersion measurements - Time Domain and Frequency Domain measurements.
3.4 Finer cut off wave length, Fiber numerical aperture measurements.

4. OPTICAL COMMUNICAITON :

4.1 Introduction of light wave.
4.2 Types of modulation, ON-OFF modulaiton
4.3 Anlog and Digital transmission.
4.4 Audio Video and Data transmission.
4.5 Computer communication using RS 232 Port.
4.6 Coherent System.

OPTICAL FIBRE ENGINEERING LAB

List Of Practical's
1. Study of reflection of light.
2. Study of LED characteristics.
3. Study o Laser characteristics
4. Study of Optical detector characteristics
5. Study of different connectors.
6. Study of different splices.
7. Study of different couplers and splitters.
8. Measurement of connectors loss.
9. Measurement of splice loss.
10. Measurement of coupling loss.
11. Study of dispersion loss in Fiber.

MICROWAVE & RADAR ENGINEERING

DETAILED CONTENTS
1. E.M. WAVE THEORY:
1.1 Boundary Condition and different forms of Maxwell Eqution
1.2 Concept of polarization of EM waves.
1.3 Concept of the electromagnetic radiation and propagation.
2. ANTENNA :
A study of Microwave antena
3. MICROWAVE:
3.1 Introduction to microwave and its applications, classification on the basis of its frequency band according ITU standards.
3.2 Effects of interelectrode capacitance, lead inductance and transit time on the signal frequency performance of conventional operations.
3.3 Construction, Operating Principles, Performance characteristics and Applications of the following -
(a) Microwave Tubes- Multi-cavity Klystron, Multi-cavity Magnetron, Reflex Klystron, Travelling wave tube and BWO.
(b) Microwave Semiconductor Devides - PIN, Tunnel Diode, IMPATT and TRAPATT and Gun diode .
3.4 Different types of waveguides and their applications. Propagation constant of a rectangular waveguide, cut off wavelength, guide wavelength. (No Mathematical Derivation)
3.5 Microwave components-Tees, Bends, Matched termination, Detector mount, Slotted section, directional coupler, Circulator and duplexar-their constructional features characteristics and application.
3.6 Microwave antennas-horn and parabolic disk antennas-their characteristics and typical applications.
3.7 Block diagram and working principles of microwave systems.
3.8 Microwave power measurements thermal convertors.
3.9 Planning of microwave links-Line of sight, fresnel zones reflecting surfaces and fade margin.
3.10 Troposcatter links-Basic idea only.
4. RADAR SYSTEMS:
4.1 Introduction to Radar, its various application. Radar range equation (No Derivation) and its application.
4.2 Block diagram and operating principle of basic pulse radar, concept of ambiguous range.
4.3 Block diagram, operating principle of CW (Doppler) and FMCW radars and their application.
4.4 Block diagram and operating principle of MTI radar.
4.5 Radar display-PPI.
5. RADIO AIDS TO NAVIGATION:
5.1 Application of loop antenna in direction finding, Errors adock antenna.
5.2 Description of different navigational system-VHF omnirange

(VCR). Distance measuring equipment (DME), Long Rang Navigational (LORAN), Instrument Landing System (ILS) and Ground Control Approach.

6. SATELLITE COMMUNICATION:

6.1 Basic idea passive and active satellites.

6.2 Meaning of the terms Orbit, Aporgee and Perigee.

6.3 Geo-stationary satellite and its need.

6.4 Block diagram and explanation of a satellite communication link.

7. FASCIMILE TRANSMISSION:

7.1 Basic concept.

7.2 Specifications of fascimile transmitter and receiver.

7.3 Block diagram & function of each block.

PROJECT

GENERAL OBJECTIVE:

Purpose of the project work is :

(i) To develop abilities of diagnosing problems.

(ii) To develop the abilities to :

(a) Make literature survey.

(b) Design/develop/frbricate/test simple circuits.

(c) Prepare documents for electronic work.

(d) Work as a team.